

# Uterine manipulator – low budget option

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## Summary

In these report the authors describe one simple option to build a uterine manipulator with disposable materials used commonly in medical practice: a foley cateter, a 60 cc syringe, and a hystrometer. They believe this manipulator safely fulfills the role of uterine exposure in laparoscopic surgery with low cost.

*Key words:* Laparoscopy; Hysterectomy; Uterine manipulator.

## Introduction

Total hysterectomy is one of the most established gynecological laparoscopic surgeries [1-3]. Uterine manipulation enables adequate uterine exposure, positioning the ureter far from the uterine arteries allowing its ligation, and preservation of the pneumoperitoneum during colpotomy [1, 4-6]. A device that provides proper uterine manipulation is of paramount importance for this procedure.

Although several devices are available in medical literature [6], cost is usually high.[1] Some authors describe, as an alternative, total laparoscopic hysterectomy without a uterine manipulator [7, 8]. Others have published the use of alternative devices created by a combination of other instruments that play the role of a manipulator adapting to locally available tools, like tubal patency test cannula [9] and uterine curette [10]. However, these fail to preserve the pneumoperitoneum during colpotomy.

The purpose of this article is to introduce a simple and inexpensive way to assemble a device that accurately and safely manipulates the uterus, while maintaining the pneumoperitoneum during colpotomy.

## Materials and Methods

The bladder tip is tied using a two-way Foley catheter with a cotton thread immediately before the cuff. The authors prefer a 22F (7.33-mm diameter) Foley catheter and a #0 cotton thread (Figure 1). A hystrometer is inserted into the urine lumen of the Foley catheter, using lubricant (water or lidocaine jelly). The hystrometer is inserted through the entire length of the catheter until its tip meets the knot. The entire hystrometer is placed inside the catheter (Figures 2 and 3). The tip of a 60-cc long-tip syringe is cut in the middle. The syringe barrel is also cut to fit the length of the vagina. If the vagina is long, the entire length of the barrel is maintained and the finger flanges are trimmed with scissors. (Fig-

ures 4 and 5). The catheter tip is inserted (with the hystrometer inside), through the tip of the syringe. The rear end of the barrel works as a cup and pointed upwards to the vagina to help delineate the incision line for colpotomy (Figures 5 and 6). After hystrometry, the cervix is dilated up to 8 mm using Hegar dilators and the tip of the catheter is inserted through the cervical canal. The catheter balloon is insufflated with 5 cc of distilled water or saline solution. This step is performed under laparoscopic view.

## Discussion

The uterine manipulation is considered one of most important surgical steps in a laparoscopic hysterectomy. In a low resource scenario, the surgical costs are still a challenge.[1] The main objective of this study is to share an easy way to perform the uterine manipulation at a lower cost.

The device insertion is safer under laparoscopic view, although it may take longer than a blind insertion. Endometrial cancer patients have a potential risk for tumor cell spread in the peritoneal cavity in the event of uterine perforation.

This device we are introducing is similar to the one described by Abd-El-Maeboud *et al.* [1] Both manipulators enable a firm grip on the uterus, are lightweight, and made with low-cost and widely available parts. By replacing the tracheal cannula for the Foley catheter, our device is thinner and its insertion into the uterus is easier. The catheter also enables the syringe barrel to move with ease, preventing an air leak during colpotomy.

The disposable 60cc plastic syringe barrel has a standard 2cm diameter, almost the same size as the average cervix[11]. In women with a large cervix, the open rear end of the barrel may not fit around it. Since the barrel is made of plastic, the colpotomy with monopolar energy should be

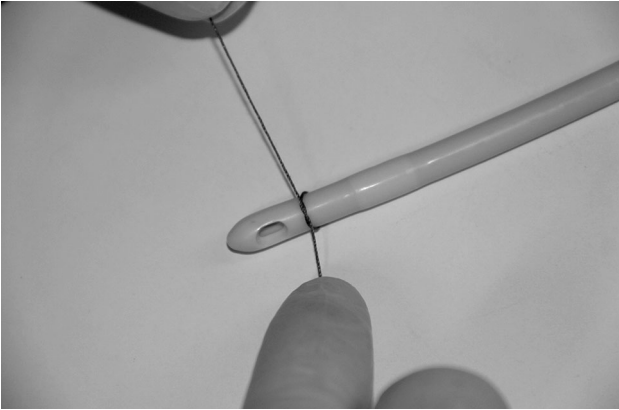


Figure 1. — A knot is tied at the distal end of the Foley catheter.



Figure 2. — A hysteroscope is inserted in the Foley catheter.

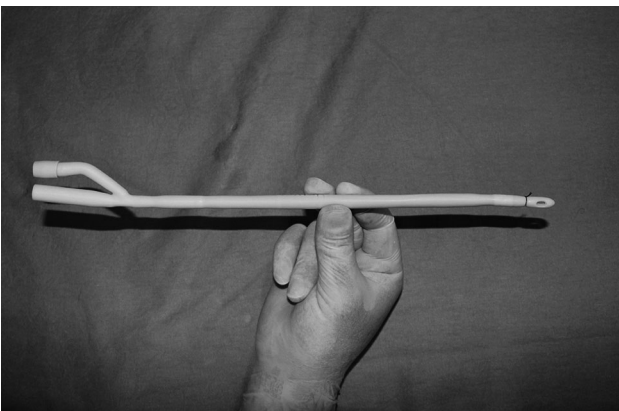


Figure 3. — A hysteroscope is entirely inserted in the catheter.



Figure 4. — The tip of the syringe is cut in the middle.

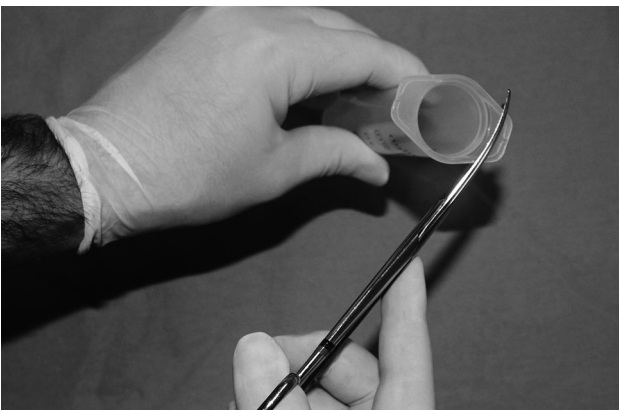


Figure 5. — The syringe's finger flanges are trimmed with scissors.

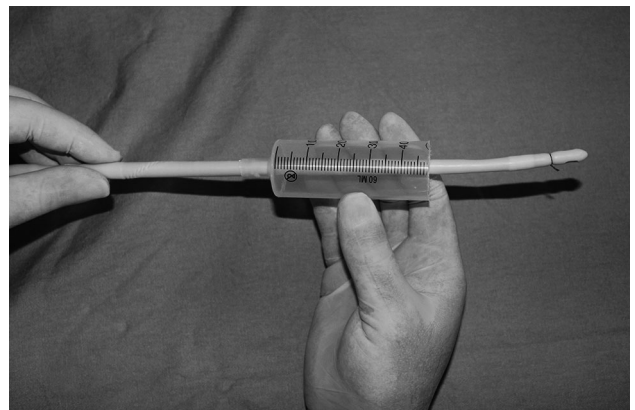


Figure 6. — The catheter is inserted into the syringe.

performed with steady and precise movements, so as not to melt the plastic cuff.

This manipulator is made of items that are cheap and readily available in most hospitals around the world. Syringes and Foley catheters are also available in different sizes and shapes, so the manipulator can be adapted by each

service to fit a patient's unique anatomy. The catheter cuff decreases the risk of uterine perforation and enables the vaginal extraction of small uteri without grasping it.

Sanmartin *et al.* demonstrated, in a prospective cohort, that the use of manipulators in endometrial cancer patients treated by laparoscopy did not increase the rate of positive

peritoneal cytology or recurrence, and did not reduce the overall five-year survival [12]. Clamping, coagulating, and sealing the fallopian tubes before placing the manipulator is a technique that apparently prevents the migration of neoplastic cells into the peritoneal cavity during hysterectomy [12, 13].

The main feature of a uterine manipulator is the anatomical exposure of the uterus and neighboring structures [1]. The authors believe this manipulator fulfills the role of uterine exposure in laparoscopic surgery, while not yielding extra safety issues. This device is a low-cost alternative that may enable laparoscopic hysterectomies where traditional manipulators are not available.

## References

- [1] Karim Hassanein Abd-El-Maeboud, Ahmed E. H. Elbohoty, Mohamed I. Amer, Ahmed Adel Tharwat, Amer Abd-Al-Aziz Khalifa: "Comparison of simple uterine manipulator-injector (SUMI) with the Cohen cannula in gynecologic laparoscopy". *Middle East Fertility Society Journal*, 2011, 16, 278.
- [2] Desai V.B., Guo X.M., Fan L., Wright J.D., Xu X.: "Inpatient Laparoscopic Hysterectomy in the United States: Trends and Factors Associated With Approach Selection". *J. Minim. Invasive Gynecol.*, 2017, 24, 151e1.
- [3] Kang H.W., Lee J.W., Kim H.Y., Kim B.W., Moon C.S.: "Total laparoscopic hysterectomy via suture and ligation technique". *Obstet. Gynecol. Sci.*, 2016, 59, 39.
- [4] Rakowski J.A., Tran T.A., Ahmad S., James J.A., Brudie L.A., Pernicone P.J., et al.: "Does a uterine manipulator affect cervical cancer pathology or identification of lymphovascular space involvement?" *Gynecol. Oncol.*, 2012, 127, 98.
- [5] Ramirez P.T., Frumovitz M., Dos Reis R., Milam M.R., Bevers M.W., Levenback C.F., et al.: "Modified uterine manipulator and vaginal rings for total laparoscopic radical hysterectomy". *Int. J. Gynecol. Cancer*, 2008, 18, 571.
- [6] Ramiro Argüello-Argüello: "Complications in 748 laparoscopic hysterectomies using an uterine manipulator with vaginal highlighter". *Revista Colombiana de Obstetricia y Ginecología*, 2012, 63, 252.
- [7] Kavallaris A., Chalvatzas N., Kelling K., Bohlmann M.K., Diedrich K., Hornemann A.: "Total laparoscopic hysterectomy without uterine manipulator: description of a new technique and its outcome". *Arch. Gynecol. Obstet.*, 2011, 283, 1053.
- [8] Mebes I., Diedrich K., Banz-Jansen C.: "Total laparoscopic hysterectomy without uterine manipulator at big uterus weight (>280 g)". *Arch. Gynecol. Obstet.*, 2012, 286, 131.
- [9] Limberger A.S. L.L., Alves N.J.A.R., Siqueira D.P., Campos S., Pellicoli M.F., Pereira C.C.: "Uso de punção única para trabalho na histerectomia por laparoscopia". *Braz. J. Endosc. Surg.*, 2010, 3, 93.
- [10] Raju K.S., Auld B.J.: "A randomised prospective study of laparoscopic vaginal hysterectomy versus abdominal hysterectomy each with bilateral salpingo-oophorectomy". *Br. J. Obstet. Gynaecol.*, 1994, 101, 1068.
- [11] Gemer O., Huerta M., Simonovsky A., Linov L., Anteby E., Lavie O.: "Diameter-by-age reference curves for the uterine cervix by computerized tomography". *J. Comput. Assist. Tomogr.*, 2009, 33, 405.
- [12] Marcos-Sanmartin J., Lopez Fernandez J.A., Sanchez-Paya J., Pinero-Sanchez O.C., Roman-Sanchez M.J., Quijada-Cazorla M.A., et al.: "Does the Type of Surgical Approach and the Use of Uterine Manipulators Influence the Disease-Free Survival and Recurrence Rates in Early-Stage Endometrial Cancer?" *Int. J. Gynecol. Cancer*, 2016, 26, 1722.
- [13] Lee M., Kim Y.T., Kim S.W., Kim S., Kim J.H., Nam E.J.: "Effects of uterine manipulation on surgical outcomes in laparoscopic management of endometrial cancer: a prospective randomized clinical trial". *Int. J. Gynecol. Cancer*, 2013, 23, 372.

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