

A Comparative Study of Use of Different Electrosurgical Techniques for Opening The Vaginal Cuff In Total Laparoscopic Hysterectomy: Monopolar Cutting, Coagulating And Harmonic Scalpel.

Dr. G S S Mohapatra¹Dr. Bharat Bhusan²
Amri Hospital, Bhubaneswar

Introduction: With the evolution of laparoscopic gynaecological surgeries the use of electrosurgery for haemostasis and cutting has also become widespread. In cases of total laparoscopic hysterectomy vault opening is one crucial step from the safety point of view. While the use of different electrosurgical techniques for this step vary from surgeon to surgeon, we compared the safety and efficacy of monopolar electric current (ME), bipolar electric current (BE) and Harmonic Scalpel (HS) in dissection of vault. The differences in vaginal cuff complication rate was evaluated between coagulation and cutting modes of monopolar current too. We also studied the post operative histological status of surrounding tissue and healing process after the use of different electrosurgical techniques.

Methods: we used the above methods for opening of vaginal cuff in TLH surgeries conducted at AMRI hospital, Bhubaneswar from January 2013 to December 2016. The total number of such surgeries conducted was 184. The ease and amount of hemostasis achieved, the preciseness of cut margin attained following vault opening, degree of surrounding tissue destruction (histological evidence) and post operative healing process (in terms of post operative hospital stay, vaginal discharge and secondary haemorrhage) were noted.

Results: The postoperative complications were significantly lower in cutting mode group compared to the monopolar coagulating mode because of decreased thermal spread, but it was least in the harmonic scalpel group. BE and HS achieved almost complete hemostasis with excellent post operative healing. The amount of surrounding tissue destruction was remarkably low in cutting mode than the coagulating mode. While with ME the vault margin attained was very precise but with poor haemostasis, for which BE was again used. Greater thermal injury with more inflammatory response was seen with ME, while the post operative period was uneventful. BE causes slightly greater inflammatory response than LS.

Conclusion: Vaginal cuff complications like vaginal discharge and secondary haemorrhage occur more frequently when vagina is entered by using electrosurgery with coagulation technique. Cutting technique is clearly a safe method for vaginal cuff opening, but gain requires the use of bipolar energy. BE is a safe and efficient method of hemostasis and ME could cause clinical and histological complications. BE causes slightly greater inflammatory response than HS though not much difference in the incidence of post operative incidence of discharge and secondary haemorrhage was seen between them.

Abstract and keywords: monopolar cutting current, coagulating current, harmonic scalpel.

I. Introduction

Total Laparoscopic Hysterectomy is currently the standard treatment for wide range of gynaecological conditions, including operable gynaecological malignancies (endometrial and cervical). The preference of minimal invasive surgery over open surgery is due to reduced blood loss, reduced postoperative complications and post operative pain. But complications following the procedures need to be considered. One crucial step of surgery is opening of vaginal cuff. Recent studies show vaginal cuff complications are recognized complications of laparoscopic and robotic hysterectomy with incidence being 1.7 - 4.1%^{1,2}. Most vaginal cuff separations do not occur as a result of predisposing conditions³. The thermal damage due to electrosurgery is the primary cause for cuff necrosis and devascularisation beyond the suture line⁴. It leads to vaginal cuff dehiscence. Dehiscence is defined as full thickness separation of anterior and posterior edges of the vaginal cuff with either partial or total separation of vaginal tissue with or without bowel evisceration¹. Our objective was to evaluate the vaginal cuff complication rates between coagulation and cutting mode of different electrosurgical techniques.

II. Methodology

Total 576 women were operated (TLH) in between February 2014 to December 2016 at AMRI Hospital, Bhubaneswar out of which in 304 patients undergoing TLH, the vault was opened by monopolar cutting current

while in 134 women colpotomy was done with coagulation technique and in the rest 138 cases, it was opened by harmonic scalpel. Electrosurgical setting in procedure was 40W for the cutting and 30W for coagulation technique. Vaginal cuff was closed with 2 - 3 interrupted or continuous suture with polyglactin 910. Patients received one dose of pre operative antibiotics in the form of Inj Ceftriaxone 1G as per hospital guidelines. Post operative immediate complications during hospital stay duration was noted. Follow up at 4 to 6 weeks with speculum examination was done. Other parameters noted were operative time, estimated blood loss, co-morbidities and histological evidence.

III. Result

Mean operative time and estimated blood loss was marginally less in the cutting current group. Total of 3 patients in coagulation group had significant post operative vaginal cuff complications like vaginal bleeding, out of whom again one patient had uncontrolled Diabetes mellitus who was on irregular medication following discharge in spite of advice. She needed admission and needed one suture with catgut 1'0 vaginally and needed one unit of Blood Transfusion. No patient in cutting group had post operative cuff complications. Very few cases in all the groups had minor episodes of vaginal bleeding during day 10 to day 14 which usually subsided with higher antibiotics.

IV. Discussion

Basic fundamental knowledge of electrosurgery is essential. Electrosurgical and electrothermal injuries during laparoscopy are thought to occur in 0.1 - 0.5% of cases^{5,6,7}. A cutting current has continuous waveform with 30 - 80 W of power and a coagulation current has discontinuous waveform with 30 - 60 W of power. Electrothermal spread is inversely proportional to voltage. So cutting produces less thermal tissue damage than coagulation. Monopolar current has been demonstrated to cause more electrothermal damage than bipolar current⁸. Cuff opening by coagulation creates high rate of post operative vaginal cuff dehiscence. Harmonic scalpel uses ultrasonic energy which has very limited thermal spread than the other two. Conclusion Cutting technique is clearly a safe method for vaginal cuff opening. BE is a safe and efficient method of hemostasis and ME could cause clinical and histological complications. Harmonic scalpel is very good too for the purpose though not far better than the rest.

References

- [1]. Cronin B, Sung VW, Matteson KA. Vaginal cuff dehiscence: risk factors and management. *Am J Obstet Gynecol.* 2012;206:284–288. [PMC free article] [PubMed]
- [2]. Nick AM, Lange J, Frumovitz M, et al. Rate of vaginal cuff separation following laparoscopic or robotic hysterectomy. *Gynecol Oncol.* 2011;120:47–51. [PMC free article] [PubMed]
- [3]. Uccella S, Ceccaroni M, Cromi A, et al. Vaginal cuff dehiscence in a series of 12,398 hysterectomies: effect of different types of colpotomy and vaginal closure. *Obstet Gynecol.* 2012;120:516–523. [PubMed]
- [4]. Kho RM, Akl MN, Cornella JL, Magtibay PM, Wechter ME, Magrina JF. Incidence and characteristics of patients with vaginal cuff dehiscence after robotic procedures. *Obstet Gynecol.* 2009;114:231–235. [PubMed]
- [5]. Schwaitzberg SD, Jones DB. Don't get burned from lack of knowledge. *Annals Surg.* 2012;256:219–220. [PubMed]
- [6]. Hulka JF, Levy BS, Parker WH, Philips JM. Laparoscopic assisted vaginal hysterectomy: American Association of Gynecologic Laparoscopists 1995 membership survey. *J Am Assoc Gynecol Laparosc.* 1997;4:167–171. [PubMed]
- [7]. Nduka CC, Super PA, Monson JR, Darzi AW. Cause and prevention of electrosurgical injuries in laparoscopy. *J Am Coll Surg.* 1994;179:161–170. [PubMed]
- [8]. Alkatout I, Schollmeyer T, Hawaldar NA, Sharma N, Mettler L. Principles and safety measures of electrosurgery in laparoscopy. *J Soc Laparoendo Surg.* 2012;16:130–139. [PMC free article] [PubMed]

Fig1 : cutting of vault by monopolar current



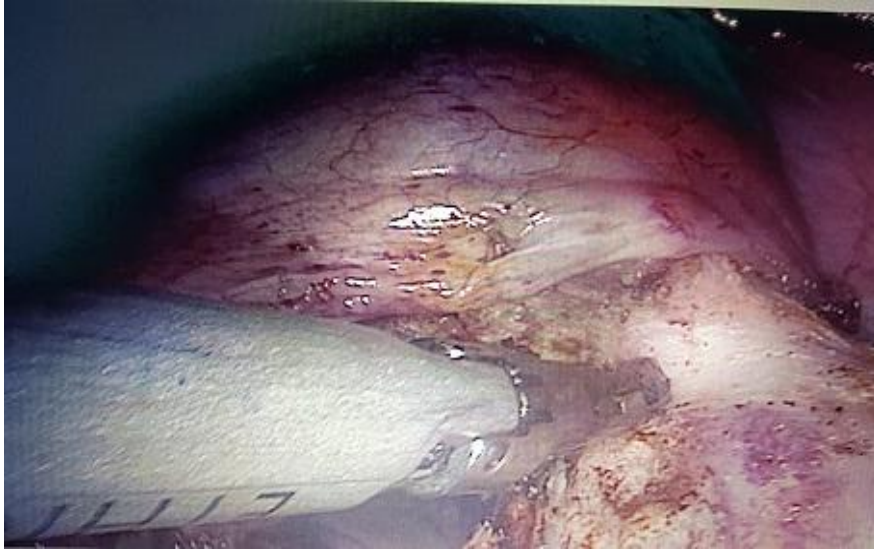


FIG 2: cutting of vault by harmonic scalpel