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Original Research Article

Bipolar vessel sealer versus conventional suturing in non-descent vaginal hysterectomy: comparative study

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ABSTRACT

Background: The aim and objective of the study is to compare bipolar vessel sealer method with conventional suturing technique in non-descent vaginal hysterectomy.

Methods: A prospective observational study was done in the department of obstetrics and gynaecology, S. C. B. Medical College and Hospital, a tertiary care centre, Cuttack, Odisha, in a period from, April 2019 to October 2020. A total of 100 patients fit under inclusion criteria were posted for non-descent vaginal hysterectomy after taking an informed consent. They were divided into (group A) conventional suturing group and (group B) bipolar vessel sealer group, using a randomised computer method. The statistical analysis of data obtained was done using statistical package for the social sciences (SPSS) version 18 software.

Results: In the present study the mean procedure time taken in minutes for NDVH using bipolar vessel sealer (BVS) was significantly shorter than suture group (57.54 ± 12.851 versus 29.26 ± 8.808 ; $p < 0.001$), the mean intraoperative blood loss in ml was also significantly lesser in BVS group (5.96 ± 1.24 versus 3.50 ± 0.73 ; $p < 0.001$). The mean post-operative pain scores using visual analogue scale (VAS) (0-10) also showed statistically significant reduction in BVS group when observed on immediate post-operative day (POD) (3.50 ± 0.73 versus 5.96 ± 1.24 ; $p < 0.001$). There was statistical reduction of pain even on POD1, POD2, and POD3 also. The length of hospital stay in days was also significantly shorter in BVS group when compared to suture group (2.10 ± 0.58 versus 5.00 ± 0.404 ; $p < 0.001$).

Conclusions: The bipolar vessel sealer proved superior to conventional suturing in regards to time taken for operating procedure, intraoperative blood loss, post-operative pain (VAS 0-10) and length of hospital stay. The mean post-operative haemoglobin and packed cell volume (PCV) values both were higher in vessel sealer group compared to suturing group although statistical significance was not attained.

Keywords: Non descent vaginal hysterectomy, Conventional suture, Bipolar vessel sealer

INTRODUCTION

Vaginal hysterectomy is considered to be the method of choice for removal of the uterus.¹ Recent studies have shown that less than one-third of hysterectomies are performed vaginally.² Vaginal hysterectomy is not frequently performed in patients with large uterine size.³ This could be because the vaginal route offers relatively limited space for surgical access to vascular pedicles and

thus surgeons have greater confidence in operating via the abdominal route.⁴ Surgical hemostasis can be secured by a variety of methods, including mechanical means like sutures or vessel coagulation diathermy.⁵ The electrosurgical vessel sealing systems had been used in vaginal hysterectomy with encouraging results.⁶ Although in skilled hands vaginal hysterectomy may be performed using standard techniques even in difficult patients, the electrosurgical bipolar vessel sealer technology permits the convenient and economical alternative.

METHODS

This was a prospective observational study conducted between April 2019 to October 2020, at the obstetrics and gynaecology department, S. C. B. Medical College and Hospital, Cuttack, Odisha, a tertiary care centre. The study protocol was approved by hospital ethics committee. Hundred women admitted for elective non descent vaginal hysterectomy for benign disease participated in the study and enrolled after informed and written consent.

Benign uterine conditions, non-descent uterus, uterine size up to 14 weeks, certain adnexal pathology like simple ovarian cyst, hydrosalpinx are included in the present study and uterine size more than 14 weeks, suspicion of genital malignancy, known bleeding disorders, complex ovarian cyst, gross pelvic adhesions, uterine descent are excluded from this study.

Patients who were included in the study were randomized to either conventional suturing (group A=50) and bipolar vessel sealer procedure (group B=50) during non-descent vaginal hysterectomy. Randomization was performed using a computer based randomisation method.

Surgical procedure

Non-descent vaginal hysterectomy was performed under spinal anesthesia in a standard fashion for both the study groups. In the suture group pedicles were clamped, cut and ligated with polyglactin suture in conventional suturing technique. For those patients operated by electrosurgical bipolar vessel sealer method, vessel sealer was used on all the pedicles on both the sides. The pedicle was clamped and sealed. The clamp was released after the beep from the system (indicating adequate coagulation) and coagulated pedicle was then cut with the scissors. The procedure time was counted from the supracervical incision on the vaginal mucosa to the complete removal of uterus in minutes. In these groups where salpinges were targeted to be removed even that was noted. Blood loss was estimated by weighing the mops on weighing scale (taking initial weight of dry mop and final weight of wet mop and taking the difference of two and adding to it the volume obtained in suction container, if any to obtain the final blood loss. All the patients were asked to score their post-operative pain after

4 hours of spinal aesthesia, on the picture depicting the visual analogue scale (VAS) on a scale of 0 to 10 visual scale (0=no pain; 10=unbearable pain). Patients were reevaluated on the same evening after 12 hours post op and then daily during their stay in hospital. Any other complications associated with the procedure were also noted.

Statistical analysis

The data obtained was entered into Microsoft excel and analysed using statistical package for the social sciences (SPSS) version 18. Frequencies and proportions were computed for categorical variables. Mean and standard deviation were calculated for continuous variables. Unpaired t test was used to compare continuous variables between study groups. A $p < 0.05$ was considered significant for all statistical inferences.

RESULTS

The mean age of study participants in group A was 47.22 ± 3.222 years with age range of 41-55 years. The mean age of study participants in group B was 47.78 ± 2.682 years with age range of 41-52 years. Overall, the study participants had a mean age of 47.50 ± 2.963 years with age range of 41-55 years (Figure 1).

The mean time for surgery (in min) in group A was 57.54 ± 12.851 whereas in group B mean time for surgery was 29.26 ± 8.808 . The mean difference was 28.28 and it was statistically significant at $p < 0.001$ (95% CI=23.91-32.65) (Table 1). The mean intra op blood loss (in ml) in group A was 186.84 ± 93.651 whereas in group B mean intra op blood loss was 47.40 ± 17.706 . The mean difference was 139.44 and it was statistically significant at $p < 0.001$ (95% CI=112.69-166.81) (Table 2). Comparison of pain scores between group A and group B using VAS (0-10) scoring system with p value < 0.05 considered statistically significant (Table 3).

The mean hospital stay in group A was 5.00 ± 0.404 whereas in group B mean hospital stay was 2.10 ± 0.580 . The mean difference was 2.90 and it was statistically significant at $p < 0.001$ (95% CI=2.70-3.09) (Table 4).

Table 1: Mean time taken for surgery (in min).

Group	Mean	Standard deviation	Standard error mean	Mean difference	95% confidence interval	T	P value
Conventional suture	57.54	12.851	1.817	28.28	23.91-32.65	12.83	<0.001
BVS	29.26	8.808	1.246				

Table 2: Mean blood loss (in ml).

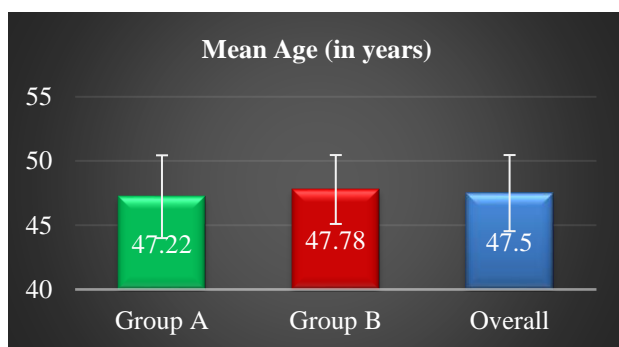
Group	Mean	Standard deviation	Standard error mean	Mean difference	95% confidence interval	T	P value
Conventional suture	186.84	93.651	13.244	139.44	112.69-166.18	10.34	<0.001
BVS	47.40	17.706	2.504				

Table 3: Post-operative pain (VAS 0-10).

Post-operative pain (VAS 0-10)	Conventional suture group A	Bipolar vessel sealer group B	P value
Post op 4 hours	5.96	3.50	<0.001
Post op 12 hours	5.02	2.24	<0.001
Post op day 1	3.88	1.64	<0.001
Post op day 3	3.06	1.02	<0.001
Post op day 45	2.28	0.42	<0.001

Table 4: Mean hospital stay (in days).

Group	Mean	Standard deviation	Standard error mean	Mean difference	95% confidence interval	T	P value
Conventional suture	5.00	0.404	0.057	2.90	2.70-3.09	29.0	<0.001
BVS	2.10	0.580	0.082				

**Figure 1: Demographics of conventional suture group A and bipolar vessel sealer group B.**

DISCUSSION

In the present study, the total operative time was significantly shorter in the BVS group compared to the suture group. In my study the mean time for surgery in suture group was 57.54 ± 12.851 whereas in vessel sealing method the mean time for surgery was 29.26 ± 8.808 . The mean difference was 28.28 and it was statistically significant at $p < 0.001$ (95% CI=23.91-32.65). The operating time was significantly shorter in the bipolar vessel sealer (BVS) group than in the suture group (38.0 ± 18.6 versus 48.0 ± 24.9 min; $p = 0.001$).⁶ The procedure duration was shorter using BVS (median duration, 32 versus 40 min; $p = 0.0003$), with fewer ligatures (1 versus 7; $p < 0.0001$) and less pain (median score, 4 versus 6; $p < 0.0001$).⁸ Participants in the vessel sealer group had shorter procedure time (52.5 min versus 90 min; $p < 0.001$) and less blood loss (230 ml versus 360 ml; $p < 0.001$).¹⁰

The total intraoperative blood loss was significantly less in the BVS group compared to the suture group.⁵ In my study, the mean blood loss (in ml) in suturing group was 186.84 ± 93.651 whereas in vessel sealing group mean blood loss was 47.40 ± 17.706 . The mean difference was 139.44 and it was statistically significant at $p < 0.001$ (95% CI=112.69-166.81). The mean estimated blood loss was

also statistically less with electrosurgical bipolar vessel sealer, 68.9 ml (range 20-200) versus 126.7 ml (range 25-600) for the suture arm ($p = 0.005$).¹¹

In the present study the BVS group presented a lower pain status which may be the cause of the reduced hospitalization. Study that evaluated post-operative pain status in women submitted to VH using BVS and found similar results.⁸ This technique delivers a precise amount of energy with thermal spread limited to an area less than 1.5 mm beyond the tissue bundle or vessel. Thus, minimized injury to adjacent tissues decreases the inflammatory response and the post-operative pain. In my study the mean immediate post-operative pain (VAS 0-10), four hours following surgery in suture group was 5.96 ± 1.245 whereas in vessel sealing group mean was 3.50 ± 0.735 . The mean difference was 2.46 and it was statistically significant at $p < 0.001$ (95% CI=2.05-2.86). Women in the vessel-sealing group reported significantly less pain (5.7 versus 4.5 on a scale of 0-10, $p = 0.03$), but after that pain scores were similar.¹²

We found that mean duration of hospital stay between the two groups was significant with $p < 0.001$. The mean hospital stay in suture group was 5.00 ± 0.404 whereas in bipolar vessel sealer group mean hospital stay was 2.10 ± 0.580 . The mean difference was 2.90 and it was statistically significant at $p < 0.001$ (95% CI=2.70-3.09). Most studies showed that postoperative hospital stay was significantly less for the patients in vessel sealer group than in conventional group ($p = 0.05$) in vaginal hysterectomy.⁷

In my study, labial burn is purely a complication of sealer group, 6 patients out of 50 i.e. 12% patients had labial burn. All were superficial, <1 cm burns, were managed conservatively. In many other studies also, labial burn is purely a complication of sealer group, which were superficial, <1 cm burns, were managed conservatively with daily dressing and healed well without scarring. The burn was superficial and was managed conservatively.⁹ We did not find any statistically significant difference in

terms of postoperative haemoglobin and haematocrit values having $p < 0.07$ and $p < 0.17$ respectively.

In our experience, the vessel sealer was easy to use with no much technical difficulties and less time consuming than conventional suturing technique. Although the device is expensive, it can be reused and hence cost effective. The drawback is the size of the tip of the instrument which has poor grasping qualities compared to standard bipolar forceps. It may not be suitable to coagulate smaller vessels for which standard monopolar or bipolar cautery is needed.

CONCLUSION

In conclusion, the use of BVS device can reduce operative time. It allows faster, safe and effective hemostasis compared with the conventional suture ligature, also reducing intra operative blood loss, post-operative pain status and hospital stay without increasing the post-operative complication rate of vaginal hysterectomy procedures. So bipolar vessel sealer can be considered as an alternative method for routine use in non-descent vaginal hysterectomy.

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