ORIGINAL RESEARCH

DOI: 10.5336/jcog.2024-106470

Comparative Study on the Safety and Efficacy of Laparoscopic Access After Veress Needle Insufflation at Palmer's Point Versus Umbilical Location in Gynecological Surgery: Analytical Research

María PINEDA MATEO[a], Ana REDONDO VILLATORO[a], Zoraida FRÍAS SÁNCHEZ[b], Sara ROJO NOVO[a], Manuel PANTOJA GARRIDO[a], Juan Jesús FERNÁNDEZ ALBA[c]

[a]University Hospital Virgen Macarena, Clinic of Gynecology and Obstetrics, Seville, Spain
[b]University Hospital Virgen del Rocío, Clinic of Gynecology and Obstetrics, Seville, Spain
[c]University Cádiz, Department of Gynecology and Obstetrics, Cádiz, Spain

ABSTRACT Objective: The aim of the study was to determine whether Palmer's point (PP) is a safer and more effective location than the umbilicus for elective insufflation with a Veress needle in laparoscopic access maneuvers. **Material and Methods:** To this end, a prospective analytical cohort study was conducted to compare PP with the umbilicus for laparoscopic access. The study period covered October 2014-May 2023, and data was obtained from 750 patients who underwent gynecological laparoscopic surgery, with 375 patients in each of the 2 groups. **Results:** The results show that the risk of presenting a complication is almost 3-fold greater if the insufflation is performed in the umbilicus (adjusted odds ratio 2.91, 95% confidence interval 1.31-6.45; p=0.009). For the patients with no previous history of laparotomy, the risk of experiencing a complication during the access maneuver in PP was lower (1.8% vs. 5.8% in the umbilicus; p<0.05). Furthermore, for the patients with a history of abdominal surgery, the complication rate was significantly higher for the umbilicus (16% vs. 5.6% in PP; p<0.05). **Conclusion:** Based on these results, the conclusion is that the safety and efficacy of PP in women who undergo laparoscopic surgery is greater when compared with the umbilical location, even in patients with no prior history of abdominal surgery.

Keywords: Laparoscopic entry; left upper quadrant; Palmer's point; Veress needle

Laparoscopic surgery is considered a minimally invasive technique for accessing the abdominal cavity.[1] The procedure's standardized and increasingly widespread use for diagnosing and treating gynecological conditions is due to the demonstrated benefits of this approach route.[2] Nevertheless, the technique is not without risk, given that an estimated 50% of surgical complications occur during cavity access maneuvers, making this step one of the major determinants of the proce-

TO CITE THIS ARTICLE:
Pineda Mateo M, Redondo Villatoro A, Frías Sánchez Z, Rojo Novo S, Pantoja Garrido M, Fernández Alba JJ. Comparative study on the safety and efficacy of laparoscopic access after veress needle insufflation at Palmer's point versus umbilical location in gynecological surgery: Analytical research. JCOG. 2025;35(2):46-54.

Correspondence: María PINEDA MATEO
University Hospital Virgen Macarena, Clinic of Gynecology and Obstetrics, Seville, Spain
E-mail: mpinedan2@gmail.com

Peer review under responsibility of Journal of Clinical Obstetrics & Gynecology.

Received: 24 Oct 2024 ***Received in revised form:*** 24 Apr 2025 ***Accepted:*** 25 Apr 2025 ***Available online:*** 16 Jun 2025

dure.[3] Therefore, efforts are increasing to determine which access technique is the safest, although the topic is currently controversial.

In 2019, the Cochrane review group assessed the risks and benefits of the various laparoscopic access techniques but found insufficient scientific evidence to determine the superiority of one technique over the others.[4] Various access maneuvers have been described in the literature. One of the most widely used techniques consists of insufflation using a Veress needle, which was popularized in 1947.[1,5] In 2021, Watrowski et al. reported that insufflation with a Veress needle is the standard access method for 80% of general surgeons and 96% of gynecologic laparoscopists.[2] Due to it being a "blind" technique, however, this type of insufflation has been associated with a variable rate of adverse events depending on the anatomical location into which the needle is inserted, particularly related to the greater number of access attempts.[6,7] To reduce the rate of major complications, alternative locations to the classical umbilicus have been developed.[2] To this end, the anatomical Palmer's point (PP)has been described as a safe variant, especially in patients with prior abdominal surgery because it presents fewer physiological adhesions and is not located over the major abdominal vessels.[8-11]

Therefore, the aim of our study was to determine whether elective insufflation with a Veress needle in PP is safer and more effective than performing it at the umbilicus for laparoscopic access maneuvers, showing a lower rate of complications and failed access attempts, given the safety that this anatomical location offers surgeons.

MATERIAL AND METHODS

A prospective, observational analytical study of cohorts was designed. The cohort exposed to the studied factor consisted of patients who underwent laparoscopic gynecological surgeries where the PP was used as the access point for abdominal cavity maneuvers. In contrast, the non-exposed cohort included patients in whom umbilical location (U) was used. The study spanned from October 2014-May 2023, during which data were gathered from patients undergoing gynecological laparoscopic procedures at the Gynecology Unit of Virgen Macarena University Hospital in Seville or the General Hospital Santa María del Puerto in Cadiz (Spain). Only surgeries performed by gynecologists who performed a minimum of ≥25 laparoscopic surgeries annually for the last 5 years were included. These surgeons were randomized to either performing the access in the PP or U during insufflation maneuvers at the abdominal cavity.

INCLUSION CRITERIA

The inclusion criteria were as follows:

- Gynecological laparoscopic surgery can be performed for both benign and oncological pathologies.
- Surgeries had to be performed in the Department of Gynecology of Virgen Macarena University Hospital of Seville or General Hospital Santa María del Puerto.
- Surgeries must have used a Veress needle as the insufflation access method to the abdominal cavity.
- These insufflation methods must have been performed at the U or PP level.

Table 1 shows the variables, which were analyzed and included in the study.

The exclusion criteria were patients undergoing surgery with a laparotomy or vaginal approach and laparoscopic surgeries with direct, open entry or with access at a location other than the Palmer or umbilical point.

STATISTICAL ANALYSIS

Initially, we performed a bivariate study, where the risk of surgical complications associated with the following variables was calculated: anatomical location of insufflation, antecedents of previous laparotomy, patient's body mass index (BMI), number of entry/insufflation attempts, need to change the location or access technique and insufflation time. The risk was determined by calculating the unadjusted odds ratio

TABLE 1: Variables included in this study

Studied variables
Age of the patient at the time of surgery
Indication of the surgery
- Endometrial, uterine, and cervical pathology (benign)
- Adnexal pathology (of the Fallopian tubes and/or ovaries)
- Pathology of the pelvic floor
- Oncological or precancerous pathology
Type of surgery
Urgent or scheduled surgery
BMI of the patient at the time of surgery
History of previous laparotomies
Number of insufflation/entry attempts needed to obtain access to the abdominal cavity.
Duration of access manoeuvres to abdominal cavity
Surgical complications derived only from insufflation/entry manoeuvres
- Intestinal
- Vascular
- Subcutaneous emphysema
- Epiploic emphysema
- Vascular lesions of the abdominal wall
- Anaesthetic
- Conversion to laparotomy due to inability of access
Need to change the location or access technique

BMI: Body mass index

(OR). The results with a 95% confidence interval (CI) that did not encompass the value of 1 were deemed significant. In this phase, the potential relationship between the studied variables and the occurrence of surgical complications was assessed. In the 2nd phase, a step-by-step multivariate logistic regression analysis was performed. The objective of this phase of the study was to determine the risk of surgical complications that can be attributed exclusively to the location of insufflation into the abdominal cavity (PP versus U). For this purpose, numerous control variables in the model were included. The analysis considered the presence or absence of surgical complications associated with laparoscopic access as the dependent variable. The main covariate included the type of access (PP versus U), and the control covariates included the presence or absence of BMI ≥25kg/m^2, the history of a previous laparotomy, and access after ≥2 attempts. The OR was calculated for each of the independent variables included in the multivariate analysis, while a risk whose CI for 95% did not contain the value 1 was significant. We considered toing statistically significant. IBM SPSS® (IBM Corp, USA) software version 24 for Microsoft Windows® (Microsoft, USA) was used for the statistical analysis.

ETHICAL APPROVAL

This study was approved by the Committee of Research Ethics of the Virgen Macarena-Virgen del Rocio University Hospitals of Seville (date: June 6, 2022; no: CEI_06/2022). The corresponding written informed consent was obtained from all patients included in the study. This study was conducted in accordance with the Helsinki Declaration principles.

RESULTS

The study included 750 patients. PP was the entry site for 375 (50%) of these patients, and the U was the site for the remaining 50%. The characteristics of the patients included in the study, as well as the type of surgical procedure, are listed in Table 2.

Based on the analyzed results, 40 patients experienced complications (representing an incidence rate

TABLE 2: General characteristics of the sample and type of surgery included in the study

Variable	n
Age of the patients	41 years (11-85)
Type of surgery	
Scheduled	604 (80.5%)
Urgent	146 (19.5%)
Indication of the surgery	
Adnexal pathology	530 (70.7%)
Uterocervical pathology	149 (19.9%)
Oncological pathology	57 (7.6%)
Pelvic floor pathology	14 (1.9%)
Patients with previous laparotomies	171 (22.8%)
BMI of the patients	
Low weight (BMI<18.5 kg/m^2)	19 (2.5%)
Normal weight (BMI 18.5-24.99 kg/m^2)	276 (36.8%)
Overweight (IMC 25-29.99 kg/m^2)	300 (40%)
Obesity (BMI≥30 kg/m^2)	155 (20.7%)
Patients in which 2 or more access attempts were performed	93 (12.4%)

BMI: Body mass index; IMC: Instrument meteorological conditions

for the entire sample of 5.3%), 4 (0.5%) of which were major complications. In 3 patients (0.4%), the complication was intestinal, and 1 (0.1%) patient experienced a major vascular lesion. In 31 patients (3.7%), the complications were minor. Of these, the most frequent was subcutaneous emphysema (2.5%), followed by lesions of abdominal wall vessels (0.8%); 3 (0.4%) involved anesthetic complications, and 5 (0.7%) involved conversion to laparotomy due to inaccessibility. Table 3 lists the incidence rate and type of complications secondary to the abdominal cavity access maneuvers, overall and stratified by each study group.

The 4 cases in which a major complication was recorded (3 cases of intestinal perforation and 1 of major vascular lesion) occurred in the umbilical access group, and the complication was secondary to the introduction of the Veress needle, thereby observing a statistically significant difference between the 2 groups. There were no recorded deaths for any patient in the study procedures. Subcutaneous emphysema was the most frequent complication in the umbilical access group (15 cases vs. the 4 observed in the PP access group). In contrast, the 3 cases in which an epiploic emphysema occurred were in the PP access group. The complication rate was 2.7% (n=10) for the PP access group and 8% for the umbilical access group (n=30), a statistically significant difference (p=0.001).

TABLE 3: Rate of complications secondary to access into the abdominal cavity

Type of complication	PP	U	Total
Mayor			
Intestinal	0	3 (0.8%)	3
Mayor vascular	0	1 (0.26%)	1
Minor			
Subcutaneous emphysema	4 (1.06)	15 (4%)	19
Omental emphysema	3 (0.8%)	0	3
Vascular lesions of the abdominal wall	0	6 (1.6%)	6
Anesthetics	2 (0.53%)	1 (0.26%)	3
Conversion to laparotomy due to inability of access	1 (0.26%)	4 (1.06%)	5
Total patients with complications	10 (2.7%)	30 (8%)	40 (5.3%)

PP: Palmer's point; U: Umbilical location

Stratifying the results by a prior history of laparotomy was especially relevant in our analysis because it is the main indication for PP access instead of the U. In the case of patients with no prior history of laparotomy, the complication rate was 5.8% (n=17) for the umbilical group, compared with 1.8% (n=5) for the PP group. When analyzing the rate of complications associated with the entry maneuvers in patients with a prior history of laparotomy, we once again observed a higher incidence rate in the umbilical entry group than in the PP entry group (16% vs. 5.6%). These differences were statistically significant in both cases ($p<0.05$).

In addition to the prior history of laparotomy, other risk factors that could be related to a higher likelihood of complications during abdominal cavity access maneuvers were analyzed. One of the analyzed factors was the number of access attempts. In 87.6% of the cases, access was achieved during the 1st attempt. In the PP group, the proportion of women in whom the 1st attempt succeeded was slightly higher than that observed in the umbilical access group (88.3% vs. 86.9%). If we take the entries on the 1st or 2nd access attempt as a whole, 98.4% of the cases in the PP group achieved access to the cavity after the 1st or 2nd attempt, while this proportion dropped to 93.3% for the umbilical access group. These intergroup differences were statistically significant ($p<0.05$). The median time of access in the PP group was longer than that in the umbilical access group (210±32 s vs. 180±70 s), which is a statistically significant difference ($p<0.001$). Another factor of interest in the study was the BMI. The median BMI was 26 kg/m^2 [interquartile range (IQR), 6 kg/m^2] for the PP group and 25 kg/m^2 (IQR, 6 kg/m^2) for the umbilical access group. This small difference was not statistically significant (p=0.15).

Lastly, the results of the multivariate analysis (Table 4) showed that, when inserting variables considered factors that affect the risk of complications during the access maneuvers (such as a BMI≥25 kg/m^2, a history of laparotomy, and the number of attempts to enter the peritoneal cavity), the risk of presenting a complication was almost 3-fold higher in

TABLE 4: Summary of the last calculated multivariate logistic regression analysis

	p value	OR	95% CI
Insufflation by umbilicus	0.009	2.911	1.313-6.451
Prior history of laparotomy	0.035	2.162	1.054-4.437
2 entry attempts	0.024	2.996	1.157-7.760
≥3 entry attempts	0.0001	9.029	3.618-2.532
Age	0.033	0.962	0.929-0.997
Excess weight	0.045	2.784	1.024-7.571
Obesity	0.001	5.981	2.163-16.537

CI: Confidence interval; OR: Odds ratio

the umbilical access group than in the PP group (adjusted OR 2.91, 95% CI 1.31-6.45; p=0.009).

DISCUSSION

PP was introduced by Raoul Palmer as a safe access variant for patients with prior abdominal surgery and intraperitoneal adhesions to minimize entry lesions.[5,9] This technique consists of inserting the Veress needle 3 cm below the left subcostal edge in the midclavicular line (Figure 1).[5,9] In addition to considering this type of access when intra-abdominal adhesions are suspected, the technique should be offered to women with obesity, in whom the navel is displaced caudally to the aortic bifurcation and especially to women with underweight, in whom the great vessels are located only 1-2 cm from the umbilicus.[5,9-11] This technique is also a good option if there are 3 failed attempts at transumbilical insufflation or when the aortic pulsations are palpated adjacent to the navel.[5,12]

Our study observed an almost 3-fold greater risk of presenting complications in the umbilical access group than in the PP group (adjusted OR 2.91, 95% CI 1.31-6.45; p=0.009).

No major complications were recorded in the PP group; however, the major complication rate for the umbilical access group was 1.06%. Major complications in laparoscopic surgery are uncommon. It is estimated that major complications occur in 0.4 of every 1,000 procedures and are thereby life-threatening.[1] Deaths resulting from laparoscopic access have been reported in 0.05-0.2% of cases and are related to lesions of the great retroperitoneal vessels and, less frequently, with intestinal lesions.[2] There were no patient deaths recorded in our data. For the umbilicus, 3 of the major lesions occurred when perforating the intestine; the remaining occurred when damaging one of the great intra-abdominal vessels. Between 50-83% of severe vascular complications, 41-50% of major intestinal complications, and 36% of urological lesions occur during the laparoscopic access.[2] The major vascular complications are secondary to the lesion of the great retroperitoneal vessels and occur approximately in 0.2-1% of procedures, with the right iliac arteries the most frequently affected in up to 48% of cases.[2] These lesions entail an estimated mortality rate of 6-31%. A safe laparoscopic access is essential for reducing the risk of surgical complications (especially when faced with periumbilical adhesions) in women who are underweight or when the patient is placed in the Trendelenburg position early.[2,13,14] Intestinal lesions have an incidence rate of 0.06-0.5%, and in 55% of the cases, the injury occurs at the start of the surgery.[2] The most frequently affected section is the ileum, followed by the sigmoid colon.[2] These lesions are considered major

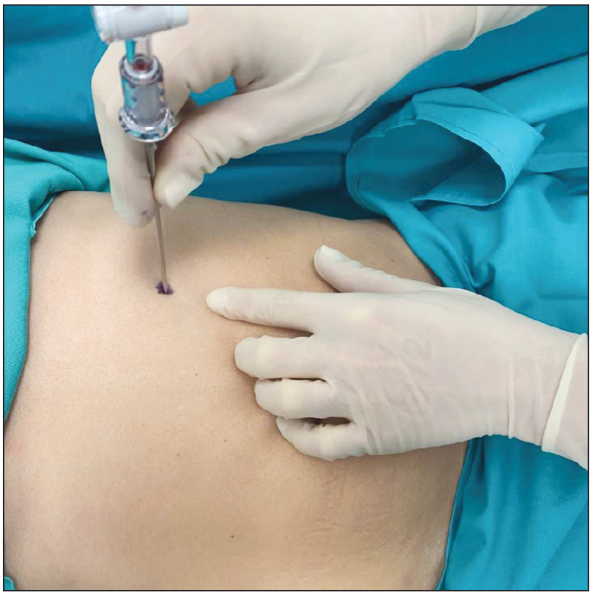

FIGURE 1: Palmer´s point. Insertion of the Verses needle 3 cm below the left subcostal border in the midclavicular line

complications, with an associated mortality rate of 0.8%, which increases to 3% when they go unnoticed and are diagnosed later.[2,15] A review article observed that 66.8% of intestinal lesions are diagnosed in the first 48 hours after surgery, with more than 20% of these lesions detected later.[16] It is estimated that 40% of the intestinal lesions are secondary to the insertion of a trocar or the Veress needle. A number of authors have indicated that open access is safer; however, there is a lack of scientific evidence supporting this statement.[17] The risk of injuring the gastrointestinal tract is greater for patients with prior laparotomies and increases the greater the procedure's surgical complexity.[2,6] Van der Voort et al. reported that in 68.9% of cases in which surgical intestinal complications occurred, the patient had abdominal adhesions; however, the authors recognized the scarcity of data on the presence of adhesions in patients without laparoscopic complications.[16]

Our results reflect a significantly lower rate of subcutaneous emphysema in PP, with 4 cases compared with the 15 cases observed in the umbilicus. In contrast, the 3 cases in which epiploic emphysema occurred were in the PP access group, differences that were statistically significant. CO_2 insufflation outside the peritoneal cavity has a variable incidence rate in the literature (0.3-2.34%), and its clinical repercussion is determined by the onset of hypercapnia and acidosis.[18] Hypercapnia is the main anesthetic complication secondary to prolonged CO_2 absorption. Although uncommon, this type of complication is considered the 2nd leading cause of death associated with laparoscopy.[19] The minor vascular complication is secondary to the lesion of abdominal wall vessels, especially the inferior epigastric vessels, which occurs in 0.3-2.5% of all procedures, especially with accessory trocars.[2,6,14] Moreover, the conversion to laparotomy can be secondary to intraoperative complications or due to inaccessibility. The risk increases with the greater complexity of the surgical procedure and when faced with repeated failed access attempts. The presence of abdominal adhesions has been identified as a risk factor for this situation, which agrees with our analysis, where the risk of conversion to laparotomy due to inaccessibility was significantly greater in the umbilicus group (1.06% vs. 0.26% for the PP group).[20]

The surgeon's inexperience and the complexity of the surgical procedures are factors that contribute to a greater risk of complications. However, our study included only surgeries in which surgeons experienced in laparoscopic surgery participated, and only those adverse effects associated with the access maneuvers were recorded; therefore, the procedure's difficulty was not an influential factor in our study. Nevertheless, there are various risk factors that increase the likelihood of complications during insufflation/entry maneuvers and that can help in the decision making on the type of access to the abdominal cavity.[20] Thus, as previously mentioned, the presence of abdominal adhesions is the main risk factor for the development of complications (not just intestinal) in laparoscopic surgery. Our study observed an increased risk of complications during the access in patients with a previous laparotomy, with an incidence rate of 16% for the umbilicus group and 5.6% for the PP group ($p<0.05$). Periumbilical adhesions are present in fewer than 1% of patients with no prior surgery; however, this percentage increases to 1.6%, 20% and up to 52% following a laparoscopy, a transverse laparotomy and a midline laparotomy, respectively.[2] Therefore, one of the main indications for insufflation in PP is a previous history of abdominal surgery. Our results support the safety of the PP in women with a history of abdominal surgery, given that the total complication rate was lower for those patients in whom the insufflation was conducted at the PP, despite the proportion of patients with a history of abdominal surgery being similar between the PP group and the umbilicus group. If we consider only the patients with prior abdominal surgery or those with no history of laparotomy, the results support the use of this location given that they show a significantly lower complication rate in the PP group than in the umbilicus group. These results reinforce the suitability of this location in general for all patients but even more so for those with a prior history of laparotomy, where complications appear with greater frequency.

There is controversy about whether increased BMI entails a higher likelihood of experiencing surgical complications. This situation could be explained by the anatomical distortion secondary to the increase in the panniculus adiposus and the difficulty in establishing the pneumoperitoneum.[11] Recently, a workgroup established that the insertion angle of the Veress needle at the umbilical level should vary from 45° to 90° in women with morbid obesity, given the variation observed in computed axial tomography images between the navel and the aortic bifurcation.[9] Fuentes et al. found that women with obesity had a 7-fold greater likelihood of conversion to laparotomy due to failed laparoscopic attempts, Findings along the same line as other publications.[13,20-22] Our results indicate that there are no significant differences between the 2 groups in terms of the patients' mean BMI. This finding reflects the homogeneity of the sample and therefore the reduction of the possibility of biases between the 2 groups.

Lastly, the failed access, as well as the number of repeated attempts at insufflation or entry, drastically increased the likelihood of both complications and conversion to laparotomy.[2,5] After analyzing our results, the proportion of women in whom the abdominal cavity was accessed during the first attempt was larger in the PP group. This difference was further increased when jointly considering ≤2 attempts (98.4% in the PP group compared to 93.3% in the umbilical group). The surgeon's experience determines the entry's success rate although factors such as uncertainty when faced with an unexpected scenario can negatively affect the success rate.[1] Therefore, the lower likelihood of major complications in PP helps reduce this risk factor, the total number of complications, the percentage of patients who require a change of technique or location, and conversions to laparotomy due to inaccessibility.

Several authors have analyzed the safety and efficacy of the PP technique. A 2010 retrospective study by Granata et al. compared 2 laparoscopic entry methods: Veress needle at the umbilicus (249 cases) and Palmer's point (136 cases). The study found that PP was preferred in cases with prior laparotomies or large pelvic masses. The authors concluded that PP was a safe technique with a low complication rate, but it was underused in gynecological laparoscopic surgery.[23] The results of our prospective analysis agree with these findings. The scarcity of comparative studies on PP reflects the underutilization of this access technique among laparoscopists. In 1999, Richardson and Sutton published the results of a prospective study on 836 women who underwent gynecological laparoscopic surgery; PP access was performed in only three cases.[7] In urological surgery, Tüfek et al. established insufflation with a Veress needle in PP as the routine method for radical laparoscopic and robot-assisted prostatectomy.[8] Nevertheless, PP is also underutilized in urological laparoscopy. In 2017, the results were published of a survey conducted on 111 surgeons. Fifty-six percent of the respondents were unaware of PP, and only 33% had used the location on some occasion.[24] In 2022, our workgroup will conduct a survey on laparoscopic access in 17 hospitals in Andalucia, Spain. Of the total hospitals, 64.7% routinely used insufflation with the Veress needle, but only 9 of these used PP as the standard anatomical location.

Ngu et al. reviewed the results of 143 patients who underwent laparoscopic surgery using Palmer's point access. They concluded that this approach is safe, effective, and especially beneficial for women with periumbilical adhesions.[25] The safety of PP in patients with prior abdominal surgery was also reported in 2002. Where it was found useful for laparoscopic surgery in 24 patients with periumbilical incisions.[26] Similar findings were reported by Tulikangas et al.[27]

The results of our multivariate analysis demonstrate that, taking into account factors such as BMI, history of laparotomy, and the number of attempts to access the peritoneal cavity, the risk of presenting a complication is almost 3-fold higher if the access is performed in the umbilicus than if it is performed at PP.

CONCLUSION

We can conclude that our results demonstrate the safety and efficacy of PP compared with the U in women who undergo laparoscopic surgery, regardless of a history of previous abdominal surgery. This fact is relevant because, after analyzing the published literature, the selection of this access route is practically restricted to this antecedent for most laparoscopists. Additionally, the comparative and prospective nature of the study, coupled with a significant number of operations, represents new and updated information for the literature on insufflation with a Veress needle at this location. However, we encourage the development of comparative randomized clinical trials between the two locations that could confirm the conclusions of this study.

Source of Finance

During this study, no financial or spiritual support was received neither from any pharmaceutical company that has a direct connection with the research subject, nor from a company that provides or produces medical instruments and materials which may negatively affect the evaluation process of this study.

Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: *Manuel Pantoja Garrido, María Pineda Mateo;* ***Design:*** *Juan Jesús Fernández Alba;* ***Control/Supervision:*** *Sara Rojo Novo, Manuel Pantoja Garrido, Juan Jesús Fernández Alba;* ***Data Collection and/or Processing:*** *María Pineda Mateo, Ana Redondo Villatoro, Zoraida Frías Sánchez, Sara Rojo Novo;* ***Analysis and/or Interpretation:*** *Manuel Pantoja Garrido, Juan Jesús Fernández Alba;* ***Literature Review:*** *María Pineda Mateo, Ana Redondo Villatoro;* ***Writing the Article:*** *María Pineda Mateo;* ***Critical Review:*** *Manuel Pantoja Garrido, Juan Jesús Fernández Alba;* ***References and Fundings:*** *María Pineda Mateo.*

REFERENCES

1. Levy L, Tsaltas J. Recent advances in benign gynecological laparoscopic surgery. Fac Rev. 2021;10:60. [Crossref] [PubMed] [PMC]
2. Watrowski R, Kostov S, Alkatout I. Complications in laparoscopic and robotic-assisted surgery: definitions, classifications, incidence and risk factors-an up-to-date review. Wideochir Inne Tech Maloinwazyjne. 2021;16(3):501-25. [Crossref] [PubMed] [PMC]
3. Dunne N, Booth MI, Dehn TC. Establishing pneumoperitoneum: Verres or Hasson? The debate continues. Ann R Coll Surg Engl. 2011;93(1):22-4. [Crossref] [PubMed] [PMC]
4. Ahmad G, Baker J, Finnerty J, Phillips K, Watson A. Laparoscopic entry techniques. Cochrane Database Syst Rev. 2019;1(1):CD006583. [Crossref] [PubMed] [PMC]
5. Vilos GA, Ternamian A, Dempster J, Laberge PY. No. 193-laparoscopic entry: a review of techniques, technologies, and complications. J Obstet Gynaecol Can. 2017;39(7):e69-e84. [PubMed]
6. Recknagel JD, Goodman LR. Clinical perspective concerning abdominal entry techniques. J Minim Invasive Gynecol. 2021;28(3):467-74. [Crossref] [PubMed]
7. Richardson RE, Sutton CJG. Complications of first entry: a prospective laparoscopy audit. Gynaecol Endosc.1999;8:327-34. [Crossref]
8. Tüfek I, Akpınar H, Sevinç C, Kural AR. Primary left upper quadrant (Palmer's point) access for laparoscopic radical prostatectomy. Urol J. 2010;7(3):152-6. [PubMed]
9. Taskforce for Abdominal Entry. Principles of safe laparoscopic entry. Eur J Obstet Gynecol Reprod Biol. 2016;201:179-88. [PubMed]
10. Cook PD, Land RP. Gastric decompression before laparoscopic entry via Palmer's point. Anaesth Intensive Care. 2017;45(6):759. [Crossref] [PubMed]
11. Varghese A, Peijnenburg E, Stone RL, Wethington SL, Levinson KL, Beavis A, et al. Laparoscopic surgical access in morbidly obese women undergoing endometrial cancer surgery: repurposing the left upper quadrant approach. Eur J Obstet Gynecol Reprod Biol. 2020;244:56-9. [Crossref] [PubMed]
12. Varma R, Gupta JK. Laparoscopic entry techniques: clinical guideline, national survey, and medicolegal ramifications. Surg Endosc. 2008;22(12):2686-97. [Crossref] [PubMed]
13. Tian YF, Lin YS, Lu CL, Chia CC, Huang KF, Shih TY, et al Major complications of operative gynecologic laparoscopy in southern Taiwan: a follow-up study. J Minim Invasive Gynecol. 2007;14(3):284-92. [Crossref] [PubMed]
14. King NR, Lin E, Yeh C, Wong JMK, Friedman J, Traylor J, et al. Laparoscopic major vascular injuries in gynecologic surgery for benign indications: a systematic review. Obstet Gynecol. 2021;137(3):434-42. [Crossref] [PubMed]
15. Alhajress GI, Al Babtain I, Alsaghyir A, Arishi H. Complications of Veress needle Versus Open Technique in abdominal surgeries. Cureus. 2021;13(5):e14926. [Crossref] [PubMed] [PMC]
16. van der Voort M, Heijnsdijk EA, Gouma DJ. Bowel injury as a complication of laparoscopy. Br J Surg. 2004;91(10):1253-8. [Crossref] [PubMed]
17. Briel JW, Plaisier PW, Meijer WS, Lange JF. Is it necessary to lift the abdominal wall when preparing a pneumoperitoneum? A randomized study. Surg Endosc. 2000;14(9):862-4. [Crossref] [PubMed]
18. Ott DE. Subcutaneous emphysema—beyond the pneumoperitoneum. JSLS. 2014;18(1):1-7. Erratum in: JSLS. 2016;20(2):e2016.00050. [PubMed] [PMC]
19. Magrina JF. Complications of laparoscopic surgery. Clin Obstet Gynecol. 2002;45(2):469-80. [Crossref] [PubMed]
20. Fuentes MN, Rodríguez-Oliver A, Naveiro Rilo JC, Paredes AG, Aguilar Romero MT, Parra JF. Complications of laparoscopic gynecologic surgery. JSLS. 2014;18(3):e2014.00058. [Crossref] [PubMed] [PMC]
21. Camanni M, Bonino L, Delpiano EM, Migliaretti G, Berchialla P, Deltetto F. Laparoscopy and body mass index: feasibility and outcome in obese patients treated for gynecologic diseases. J Minim Invasive Gynecol. 2010;17(5):576-82. [Crossref] [PubMed]
22. Peña-Fernández M, Solar-Vilariño I, Rodríguez-Álvarez MX, Zapardiel I, Estévez F, Gayoso-Diz P. Assessment of morbidity in gynaecologic oncology laparoscopy and identification of possible risk factors. Ecancermedicalscience. 2015;9:606. [Crossref] [PubMed] [PMC]
23. Granata M, Tsimpanakos I, Moeity F, Magos A. Are we underutilizing Palmer's point entry in gynecologic laparoscopy? Fertil Steril. 2010;94(7):2716-9. [Crossref] [PubMed]
24. Johnston WK 3rd, Linsell S, Miller D, Ghani KR. Survey of abdominal access and associated morbidity for robot-assisted radical prostatectomy: does Palmer's point warrant further awareness and study? J Endourol. 2017;31(3):283-8. [PubMed]
25. Ngu SF, Cheung VY, Pun TC. Left upper quadrant approach in gynecologic laparoscopic surgery. Acta Obstet Gynecol Scand. 2011;90(12):1406-9. [Crossref] [PubMed]
26. Lam KW, Pun TC. Left upper quadrant approach in gynecologic laparoscopic surgery using reusable instruments. J Am Assoc Gynecol Laparosc. 2002;9(2):199-203. [Crossref] [PubMed]
27. Tulikangas PK, Robinson DS, Falcone T. Left upper quadrant cannula insertion. Fertil Steril. 2003;79(2):411-2. [Crossref] [PubMed]