

Vaginal Vault Haematoma Following Hysterectomy at a Tertiary Hospital

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Dedication

To my husband Leo and my son Leo, who endured 4 years' absence of a wife and a mother as a result of my academic pursuance. I could not have done this without your understanding, encouragement and support. You two have been my source of inspiration! May the Almighty God reward you abundantly.

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ABSTRACT

Background

Hysterectomy is the second most commonly performed surgical procedure among women of the reproductive age group, after caesarean section. Vault haematoma is a recognized complication of hysterectomy that may be associated with postoperative morbidity. Ultrasound examination of the vault is useful in the diagnosis of post hysterectomy vault haematoma as a cause for febrile morbidity. This study was conducted to determine the incidence and clinical significance of post hysterectomy vault hematomas in a South African Academic setting.

Methods

This was a prospective descriptive observational study. Women aged 18 and above, scheduled for elective hysterectomy for benign indications were enrolled in the study after providing written informed consent. Transvaginal ultrasound scan was done at 48-72 hours post-operative and clinical notes were reviewed 3 months postoperatively.

Results

Fifty patients were included in the study. Incidence of vault haematoma in this cohort was 30% (95% CI 18-44%). The majority of vault haematomas was 2-5cm in largest diameter (67%) followed by those that were more than 5cm (27%) and those less than 2cm (6%). There was no statistically significant difference in the incidence of vault haematoma between the different routes of hysterectomy (Fisher's exact 0.124)

There was no association between the presence of a vault haematoma and postoperative morbidity (fever, haemoglobin level, prolonged hospital stay, complications at follow up). None of the patients with vault haematoma was symptomatic up to the time of discharge from the hospital. One patient with a vault haematoma more than 5cm was readmitted on Day 15 postoperative with a foul smelling vaginal discharge that was treated successfully with oral antibiotics.

Conclusions

Vault haematoma is a common finding following elective hysterectomy for benign gynaecological indications. Patients with vault haematomas are mostly asymptomatic. There is no association between the presence of a vault haematoma and postoperative morbidity.

ABSTRAK

Agtergrond

Histerektomie is die tweede mees algemeenste chirurgiese prosedure wat uitgevoer word op vroue in die reprodktiewe ouderdomsgroep, na keisersnit. Koepelhematoom is 'n erkende komplikasie van histerektomie wat geassosieer word met post-operatiewe morbiditeit. Ultraklank ondersoek van die koepel is waardevol in die diagnose van post-histerektomie koepelhematoom as 'n oorsaak van koors. Hierdie studie is gedoen om die voorkoms en kliniese belang van post histerektomie koepelhematome in 'n Suid-Afrikaanse akademiese hospitaal te bepaal.

Metodes

Dit is 'n prospektiewe, beskrywende studie. Vroue, 18 jaar en ouer, wat bespreek was vir elektiewe histerektomie vir benigne indikasies, het deelgeneem aan die studie nadat skriftelike toestemming verleen is. Transvaginale ultraklank ondersoek is gedoen 48-72 ure postoperatief en kliniese notas tot 3 maande postoperatief is bestudeer.

Resultate

Vyftig pasiënte is bestudeer. Voorkoms van koepelhematoom in hierdie kohort was 30% (95% VI 18-44%). Die meerderheid van koepel hematome se grootste omtrek was 2-4cm (67%) gevolg deur sommige meer as 5cm (27%) en 'n paar minder as 2cm (6%). Daar was geen statistiese verskil in die voorkoms van koepel hematoom tussen die verskillende histerektomie opsies nie (Fisher eksakte toets 0.124).

Daar was geen assosiasie tussen die teenwoordigheid van koepel hematoom en post-operatiewe morbiditeit (koors, hemoglobienvlak, verlengde hospitaal verblyf, komplikasies by opvolg). Geen van die pasiënte met koepel hematoom was simptomaties tot en met ontslag van die hospitaal nie. Een pasiënt met 'n koepel hematoom van meer as 5cm is heropgeneem op dag 15 postoperatief met 'n slegruikende afskeiding wat suksesvol behandel is met orale antibiotika.

Gevolgtrekkings

Koepel hematoom kom algemeen voor na elektiewe histerektomie vir benigne ginekologiese indikasies. Pasiënte met koepel hematome is meestal asimptomaties. Daar is geen assosiasie tussen die voorkoms van koepel hematoom en post-operatiewe morbiditeit nie.

CHAPTER 1

BACKGROUND

1.1 Hysterectomy and its complications

Hysterectomy is a commonly performed gynaecologic surgical procedure. In the United States, it is the second most commonly performed surgical procedure among women of the reproductive age group, after caesarean section [1]. Statistics for the developing world are lacking. It is generally a safe procedure with mortality in most centres being 1-2 per 1000 procedures.

As a major surgical procedure, hysterectomy may be associated with significant postoperative morbidity. Common complications of hysterectomy include haemorrhage, infection and injuries to adjacent organs including bowel, urinary bladder and ureters, and thromboembolic events. The incidence of haemorrhage is 1-5 %. Haemorrhage is reportedly most common with vaginal hysterectomy, followed by abdominal hysterectomy then laparoscopically assisted vaginal hysterectomy [2].

Blood loss during hysterectomy averages 300 millilitres [3]. Significant arterial bleeding is usually from the uterine arteries or the ovarian vessels near the insertion of the infundibulopelvic ligaments and occurs in less than 1 percent of cases [4]. Venous bleeding is often more bothersome than arterial bleeding, but can usually be controlled with pressure and/or suture ligation. Bleeding from peritoneal edges or raw surfaces may be controlled by cautery or application of topical hemostatic agents.

Early and late postoperative haemorrhage occurs in 1-5 percent of cases [4]. Early postoperative haemorrhage after hysterectomy may present as bleeding from the vagina or as deteriorating vital signs, falling hematocrit level, and flank or abdominal pain. The first presentation usually represents bleeding from the vaginal cuff or one of the pedicles, while the latter presentation may represent retroperitoneal hemorrhage.

These two situations are approached differently in evaluation and treatment, but both involve prompt stabilization of vital signs, fluid and blood product replacement, and constant surveillance of the patient's condition. Physical examination typically reveals tenderness and dullness in the flank and abdominal distension. In many instances, the bleeding will tamponade and stop, forming a hematoma that will eventually reabsorb. In some cases, an otherwise stable patient will have a significant drop in hematocrit during the postoperative period, usually on Days two to four. Ultrasound may demonstrate free intraperitoneal fluid or haematoma formation. Ultimately, the patient may drain a large amount of watery brown fluid from the vagina.

Surgical site infection following hysterectomy can either be on the abdominal incision, vaginal vault or the pelvic tissues. Vaginal vault infection can be in the form of vaginal cuff cellulitis or abscess. Risk factors for post hysterectomy abscess include untreated pelvic inflammatory disease (PID), bacterial vaginosis, endometrioma, hydrosalpinx, previous laparotomy, postoperative haematoma, and anatomic anomalies [5]. In addition, one retrospective review of 413 women undergoing hysterectomy at a single institution reported increased risk of postoperative pelvic abscess when gelatin-thrombin haemostatic material was used during surgery [6]. Bacterial vaginosis at surgery increases the risk of post hysterectomy cuff cellulitis and subsequent pelvic abscess formation.

1.2. General Measures to reduce the risk of complications during hysterectomy

1.2.1 *Preoperative preparation*

Hysterectomy is a major gynaecological surgical procedure. Few procedures for benign disease engender as much patient anxiety and concern as hysterectomy to the woman. As such, it is very important to thoroughly evaluate patients before they are taken for the procedure. The following aspects should be considered and thoroughly discussed with the individual patients, taking into consideration her unique circumstances: indication of the surgery, risks and benefits of the surgery, alternative treatment to the surgery and

the expected outcomes of the surgery. This discussion should be initiated at the time the decision is being made and again at the immediate preoperative assessment.

The surgeons' experience and competence with the procedure should be taken into account when planning surgery particularly in choosing the route of the hysterectomy. Patients with bacterial vaginosis should be treated with antibiotics for eight days, starting four days prior to surgery. This has been shown to reduce the risk of vaginal cuff cellulitis and abscess formation in this group of patients.

All patients undergoing hysterectomy must get prophylactic antibiotics given 30 minutes to one hour prior to making the surgical incision. If the procedure exceeds four hours, a repeat dose should be given. This has been shown to reduce postoperative infection [7].

Consideration should also be made for thromboprophylaxis. The use of graded stockings starting prior to surgery and continued postoperatively until the patient is ambulant has been shown to reduce the risk of thromboembolic events.

1.2.2 *Intraoperative measures*

Good communication between the surgical, nursing and anaesthetic teams is of paramount importance in the operating room for prevention of mistakes and to identify and deal with complications timeously. The WHO surgical safety checklist is among the tools that have been shown to ensure adherence to pertinent intraoperative safety. This ensures that the right surgery is performed on the right patient, the team is aware of anticipated complications and measures to reduce the risk are in place, and that all instrumentation is sterile to prevent infection.

Furthermore, careful surgical technique is one of the most important factors in the prevention of postoperative morbidity. The surgeon must have the skill and competence

to perform the planned surgery. Careful and gentle handling of tissue is a prerequisite to minimise unnecessary tissue trauma and bleeding.

Furthermore, all instruments and swabs used during surgery should be counted and accounted for at the completion of surgery.

1.2.3 Postoperative Measures

Careful surveillance should be instituted in the postoperative period. This includes at least daily examination by the surgical team, and regular monitoring of the patient's vital signs. Any abnormalities noted should be investigated and treated promptly and accordingly. This will ensure that complications are detected and treated early to avert further morbidity and mortality.

In the postoperative period, patients at risk for thromboembolism should receive thromboprophylaxis. Mechanical, medical or combination of both methods should be instituted until the patient is fully ambulant. Patients should be encouraged to mobilise at the earliest possibility to prevent thromboembolism and improve wound healing.

In addition, unnecessary prolonged fasting should be avoided. Following hysterectomy, patients can resume full diet within 24 hours as long as there were no intraoperative complications to prohibit oral feeds.

Wound care is another important aspect in postoperative prevention of complications, particularly wound infection. Wounds should remain covered for the first 48-72 hours. Antibiotic prophylaxis should be continued for 48-72 hours for patients at high risk for infection e.g. diabetics and immunosuppressed patients.

1.3 Hysterectomy and vault haematoma

Following hysterectomy, some blood may collect at the vault and form a haematoma. This is believed to be a result of residual bleeding at the end of the operation [8]. The incidence of vault haematoma following hysterectomy has been reported to range from 8% to 98% [9] [10] [11] [12] . Kuhn et al , described the occurrence of vault haematomas as an invariable sequel of vaginal hysterectomy, with an incidence of 98% [10].

Traditionally, vaginal vault haematomas are considered to be an important cause of postoperative morbidity after hysterectomy. For instance, the CREST study found that 1.2% of patients undergoing vaginal hysterectomy had to return to the operating room because of vaginal vault bleeding compared with 0.3% who had abdominal hysterectomy, whereas 2.1% and 3.1% of women, respectively, experienced vaginal cuff infections. Toglia and Pearlman, in a prospective study of 38 women, found post hysterectomy fluid collections to be associated with an increased risk of febrile morbidity and vaginal cuff cellulitis [13].

There is also evidence that pelvic collections can occur in the absence of symptoms or signs. In a study comparing the incidence of vault haematoma following abdominal, vaginal, and laparoscopically assisted hysterectomy, Miskry et al 2001 found that vaginal vault collections were relatively uncommon, often asymptomatic, and similar between the three routes of hysterectomy [9]. Some authors suggest that vault collections may be more common following vaginal hysterectomy [14] [15].

There is currently no consensus on the clinical management of vault haematomas. Management options include expectant, medication (antifibrinolytics with or without antibiotics) or surgical drainage [16]. Small haematomas, (2-3.9cm), are unlikely to cause postoperative morbidity. They can therefore be managed expectantly. Moderate and large haematomas are likely to cause postoperative morbidity and so may require drainage to avert morbidity [17] .

1.4 The role of ultrasound in detecting vault haematomas

In the early postoperative period, vaginal vault haematomas may not be clinically apparent. Ultrasound examination of the vault has been proven useful in the detection of vault haematoma [18]. It is easy to perform, inexpensive, distinguishes between fluid and solid tissue without ionizing radiation, provides excellent imaging of the upper genital tract, and can be done at the bedside. Transvaginal ultrasound is particularly thought to be more accurate for detecting pelvic pathology [16].

1.5 Vault haematomas and postoperative morbidity

Vault haematoma is a recognized complication of hysterectomy that may be associated with postoperative morbidity [8]. The clinical picture with post-operative pelvic haematomas varies. Many patients may be asymptomatic whereas some may present with postoperative vaginal bleeding, (spotting to profuse bleeding), postoperative discomfort, abdominal distension, paralytic ileus, fever, foul smelling vaginal discharge, abscess formation, tenesmus, nausea, vomiting or diarrhoea. If left untreated, severe morbidity can ensue with development of septicaemia followed by septic shock, acute renal failure and acute respiratory distress syndrome (ARDS). Rarely rectovaginal fistula formation may also occur [19].

At present, there is conflicting evidence as to whether the finding of vaginal vault hematoma is associated with significant postoperative morbidity after hysterectomy. Toglia and Pearlman, in a prospective study of 38 women, found post hysterectomy fluid collections to be associated with an increased risk of febrile morbidity and vaginal cuff cellulitis [13]. In another study of 50 women undergoing vaginal hysterectomy, vault haematoma was invariably associated with postoperative fever [10]. However, some studies have found that pelvic collections can occur in asymptomatic patients.

1.6 Rationale for the study

Untreated vault haematoma may be a cause of significant postoperative morbidity. To date, there are no studies exploring the occurrence and significance of vault

haematomas in South Africa and Africa as a whole. We therefore conducted this study to determine the incidence and significance of post hysterectomy vault hematomas in a South African tertiary Hospital setting.

1.7 Objectives

- To determine the incidence of vault haematoma following hysterectomy as detected by transvaginal ultrasound.
- To describe the relationship between the presence of vault haematoma and post-operative morbidity.
- To describe any difference in the incidence of vault haematoma between abdominal, vaginal or laparoscopic hysterectomy.

CHAPTER 2

METHODS

2.1 Type of study

This was a prospective descriptive observational study.

2.2 Study setting

The study was conducted in the Department of Obstetrics and Gynaecology at Tygerberg Academic Hospital in Cape Town, South Africa. Tygerberg Hospital is a tertiary hospital located in Parow, Cape Town. The hospital is the largest hospital in the Western Cape and the second largest hospital in South Africa. It acts as a teaching hospital in conjunction with the University of Stellenbosch's Health Sciences Faculty, serving the Metro East region of Cape Town. It has a catchment population of over 2.6 million. The department of Gynaecology at Tygerberg Hospital is organised based on a four firm roster. Each firm has one general Gynaecology operating list per week. On average, there will be at least one hysterectomy done on these lists for benign indications.

2.3 Study population

The study enrolled women undergoing non radical elective hysterectomy.

2.3.1 Inclusion criteria

- Women aged 18 and above
- Able to provide written consent
- Non radical elective hysterectomy i.e. no pelvic lymphadenectomy required at surgery
- No detectable pelvic fluid collection prior to surgery

2.3.2 Exclusion criteria

- Age less than 18 years.
- Unable or unwilling to provide consent
- Radical hysterectomy with pelvic lymph node dissection
- Vaginal repair procedure at time of hysterectomy
- Presence of pelvic fluid collection prior to surgery
- Patients known with bleeding disorders
- Patients on long term anticoagulant therapy

2.4 Sample size

We enrolled fifty patients undergoing non radical elective hysterectomy between June 2014 and February 2015.

2.5 Duration of study

Patients were prospectively enrolled over a nine month period, from June 2014 to February 2015. Review of patient folders was done up to June 2015. Data entry, cleaning and analysis was done until December 2015.

2.6 Study procedures

Potential participants were approached prior to surgery, on the day they were admitted for preoperative evaluation. They were screened by the investigator (MM), for inclusion into the study. For those who met the inclusion criteria, the study was explained to them in detail. Informed consent was obtained prior to surgery. Once consent had been granted, participant demographic data and history was collected using a predetermined data sheet. Patients had the planned hysterectomy as per protocol by the responsible firm, usually comprising a consultant and a senior registrar. All hysterectomies were done by a team comprising a registrar and a consultant at the minimum. The investigator did not intervene in deciding which doctor was going to perform the surgery.

The participants had a transvaginal ultrasound scan at 48 to 72 hours postoperative. Ultrasound scans were done by one qualified and experienced sonographer in the Obstetrics and Gynaecology Ultrasound department during working hours from Mondays to Fridays. One ultrasound machine was used for all the participants (Voluson E8) using a 5MHz vaginal probe. Sagittal, coronal and transverse views were taken and measurements performed.

Figure 2.1: Vaginal vault with no haematoma

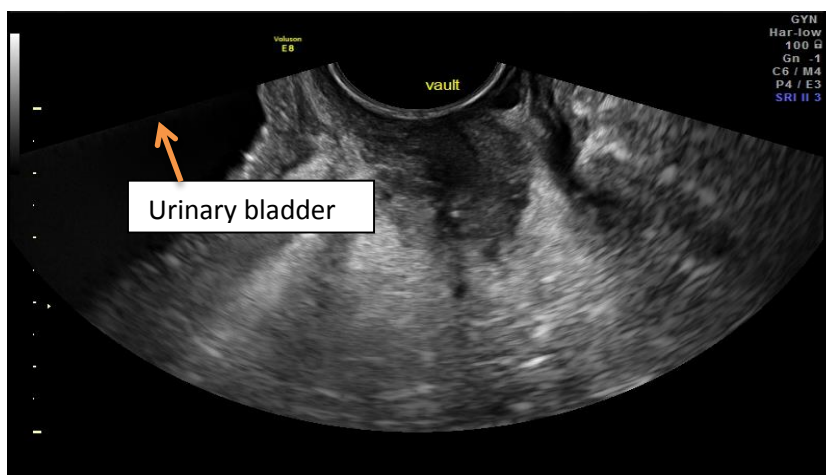
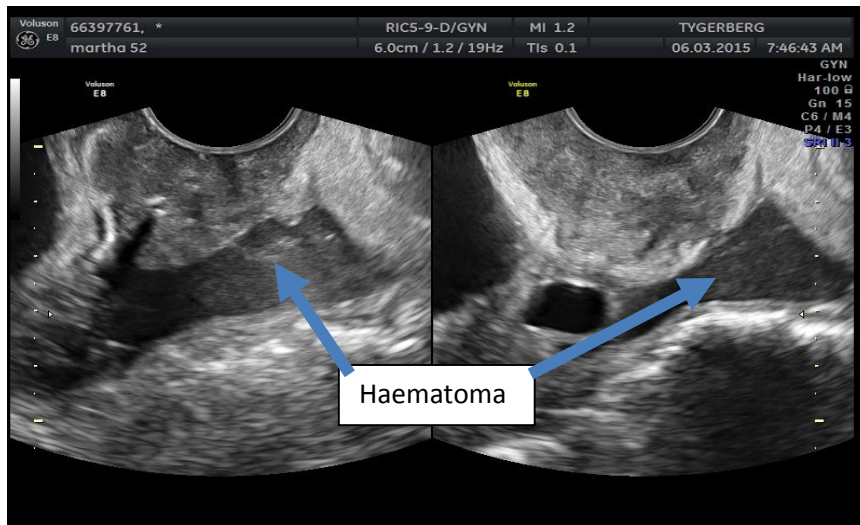


Figure 2.2: Vaginal vault with haematoma

2.7 Data collection and analysis

A data collection sheet was used to collect data (Appendix 1). On admission, patient's demographic data, baseline haemoglobin, vital signs and symptoms were collected. Postoperatively, case notes were reviewed to assess the occurrence of postoperative fever, haemoglobin drop, haemorrhage and need for repeat surgery in the immediate postoperative period. Case notes were further reviewed 3 months post-operative to determine the occurrence of delayed morbidity. The patients who did not follow up at the scheduled 6 weeks postoperative visit were contacted to ask if they had any re admission related to their surgery and were encouraged to return to the clinic for their histology results.

Data was entered into an excel spreadsheet and analysed using Microsoft Excel and Stata. Descriptive statistics were used to present results.

2.8 Ethical considerations

The study protocol was submitted for ethical review and was approved by the Stellenbosch University Health Research Ethics Committee on 26 March 2014. The ethics reference number for the study was S14/02/035.

Potential participants were approached and consent obtained before entry into the study. Study numbers were used to identify participants to maintain confidentiality.

CHAPTER 3

RESULTS

A total of 65 potential participants were approached. Of these, 55 gave consent to join the study. Four patients withdrew consent postoperatively for various reasons and so did not get the ultrasound scan done. One patient could not tolerate the transvaginal scan due to pain so the procedure was abandoned. A total of fifty patients had transvaginal scans 48-72 hours post-operative and were included in this analysis.

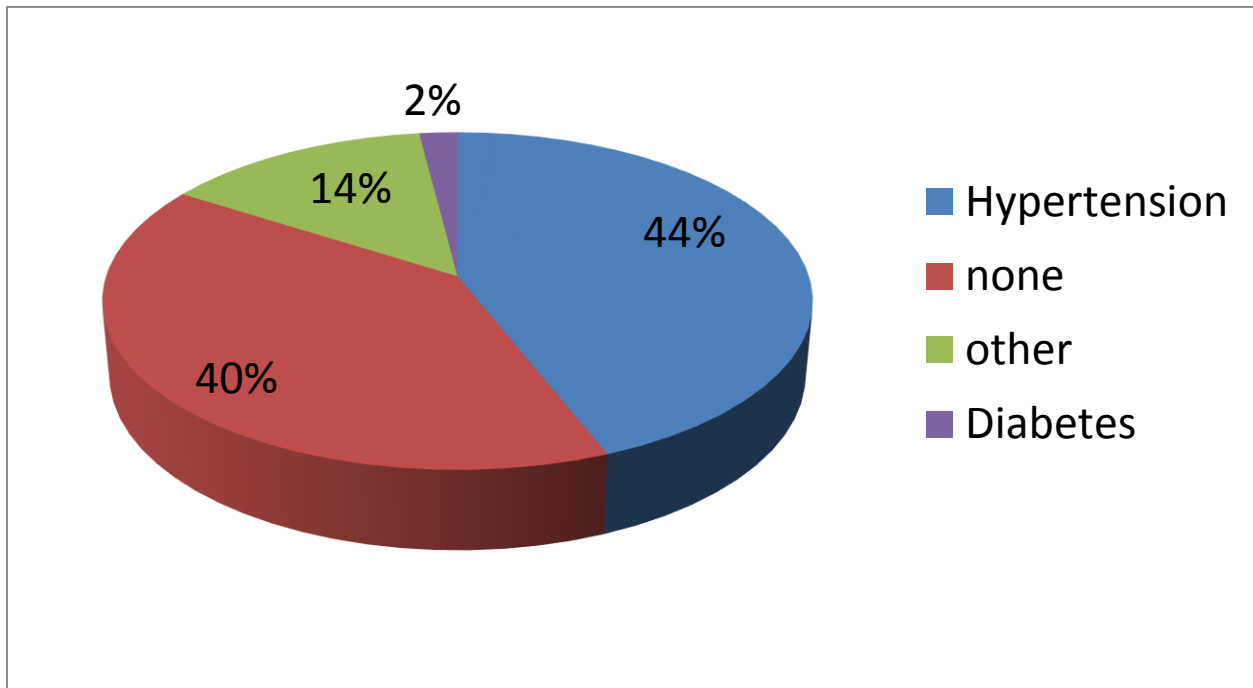
3.1 Participant Baseline characteristics

Table 1 summarises the participant's baseline characteristics. The mean age of the participants was 47.9 years (standard deviation 9.16).

Table 3.1: Preoperative characteristics

Characteristic	Mean(Standard deviation)
Age (years)	47.9 (9.16)
Baseline Hb (g/dl)	12.29 (2.01)
Baseline PR (beats/min)	82.5 (8.76)
Baseline Temp (0C)	35.5 (4.7)
Baseline RR (breaths/min)	20.9 (10)

Approximately half of the patients had no medical comorbidities. The commonest comorbid condition at baseline was hypertension. (See Figure 1)

Figure 3.1: Baseline Chronic Illness

3.2 Indications for hysterectomy

Uterine leiomyoma (fibroid uterus) was the commonest indication for hysterectomy in this cohort of patients. Thirty five patients (70%) had hysterectomy for Uterine fibroids two patients (4%) had abnormal uterine bleeding not related to fibroids and 13 patients (26%) had other indications including persistent high grade intraepithelial lesion (HSIL), postmenopausal bleeding, benign ovarian masses, and very early stage cervical cancer.

Table 3.2: Indications for hysterectomy (n=50)

Indication	Number (%)
Uterine fibroids	35 (70)
Abnormal uterine bleeding not related to fibroids	2 (4)
Other	13 (26)

3.3 Route of hysterectomy

The majority of patients had abdominal hysterectomy. Of the fifty patients enrolled, 42 (84%) had abdominal hysterectomy, 2 (4%) had total vaginal hysterectomy, 3(6%) had laparoscopic hysterectomy, and 3 (6%) had laparoscopic assisted vaginal hysterectomy.

3.4 Incidence of vault haematoma

Fifteen patients had a vault haematoma detected at transvaginal ultrasound scan. The incidence of vault haematoma in this cohort of patients was thirty percent (95% confidence interval 18-44 %). See Figure 2.

Figure 3.2: Incidence of Vault Haematoma

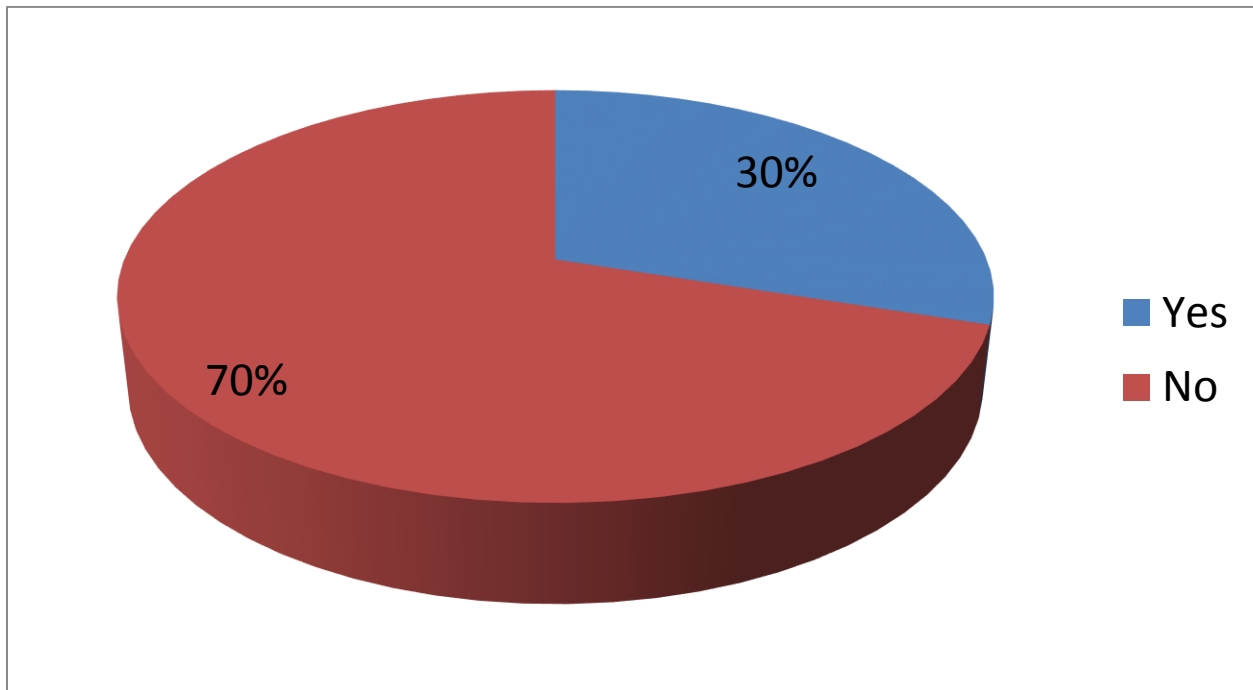
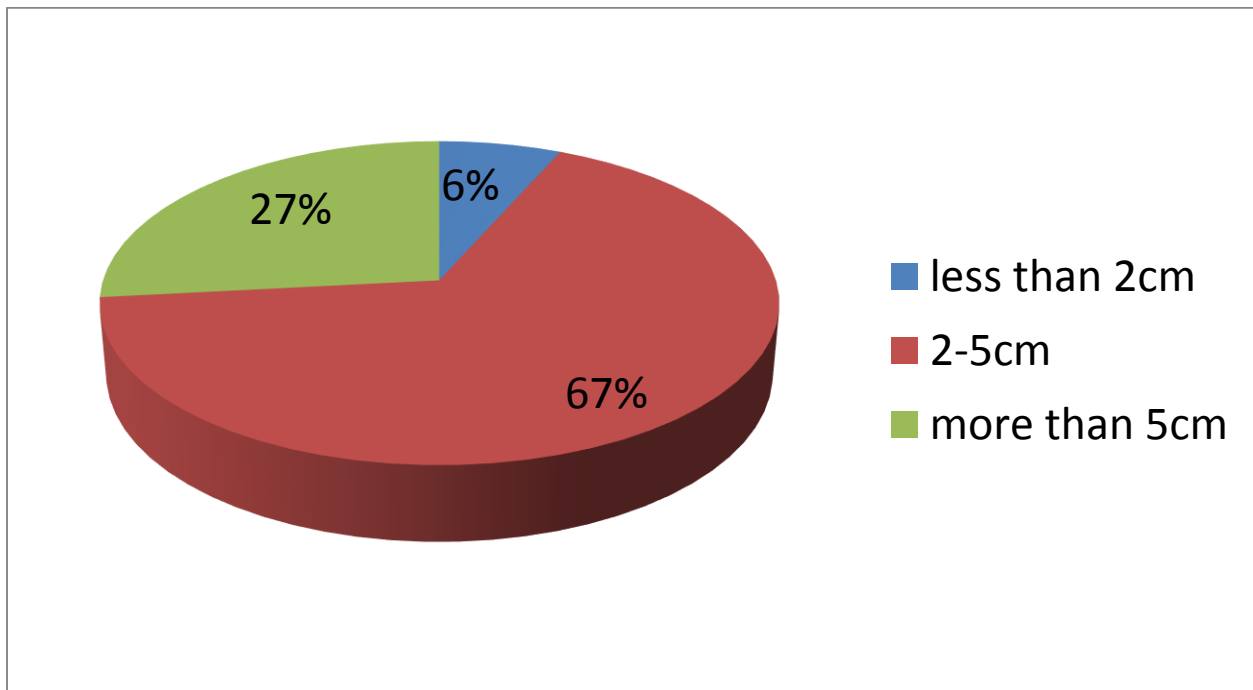


Figure 3.3: Size of Vault Haematoma



The majority of the haematomas were 2-5cm (10/15). Four patients had haematomas larger than 5 centimetres. 1 patient had a haematoma less than 2cm.

3.5 Vault haematoma and the route of hysterectomy

Twelve of the 15 haematomas were in the abdominal hysterectomy group. There was one haematoma in the Laparoscopic hysterectomy group, 2 in the vaginal hysterectomy group and none in the laparoscopically assisted vaginal hysterectomy group. There was no statistically significant difference in the occurrence of vault haematoma in the different routes (fishers exact 0.124).

Table 3.3: Vault haematoma and Route of Hysterectomy

Vault haematoma present	Route of hysterectomy				Total
	Vaginal N (%)	Abdominal N (%)	Laparoscopic N (%)	LAVH N (%)	
No	0 (0)	30(71.4)	2 (66.7)	3 (100)	35
Yes	2(100)	12 (28.6)	1(33.3)	0(0)	15
Total	2 (100)	42 (100)	3(100)	3 (100)	50

Fishers Exact 0.124

3.6 Clinical picture of patients before discharge

Of the fifty patients in the study, one patient had a fever more than 38.5°C on Day 3 postoperatively. This patient did not have a vault haematoma on ultrasound scan. She had lower urinary tract symptoms of frequency and dysuria. Urine and blood cultures

were negative after 72 hours. Temperature settled with empirical antibiotic treatment with Augmentin.

The rest of the patients were asymptomatic until the day of discharge from the hospital.

3.7 Postoperative morbidity related to vault haematoma

There was no association between the presence of vault haematoma and postoperative morbidity in this group of patients.

3.7.1 *Febrile morbidity*

In the group of the patients with Vault haematoma, none had temperature more than 38.5°C. There was one patient with a temperature more than 38°C in the group of patients with no vault haematoma. There was no statistically significant difference in temperature between the two groups.

3.7.2 *Haemoglobin level*

There was no difference in the mean haemoglobin levels between the two groups both pre- and postoperatively (mean difference -0.03, t=0.9).

3.7.3 *Readmission*

There was no statistically significant difference in the occurrence of readmission between the two groups. One patient with a vault haematoma of < 5cm was readmitted with a foul smelling vaginal discharge on day 15 post-operative. She was systemically well, afebrile and haemoglobin was 10.9g/dl. She was treated with antibiotics and discharged the next day to complete a course of antibiotics as an outpatient. She was subsequently followed up weekly at the gynaecological outpatient clinic. She recovered well after 2 weeks of follow up. The haematoma decreased in size. The last documented ultrasound scan showed a vault haematoma measuring 32x34x23mm.

3.8 Prolonged hospital stay

None of the patients with a vault haematoma had prolonged hospital stay attributable to the haematoma alone. One of the patients with vault haematoma had prolonged hospital stay because of pulmonary embolism which developed on Day 1 post-operatively. She was started on a therapeutic dose of fractionated heparin and warfarin. She had her ultrasound scan 48 hours after commencing the anticoagulation therapy and discharged from hospital on Day 7 post-operative.

3.9 Other complications in the cohort of patients

3.9.1 *Wound sepsis*

There were two patients (both with no vault haematoma) that were readmitted with wound sepsis. One of these required wound debridement in the operating theatre.

3.9.2 *Thromboembolic events*

One patient developed a pulmonary embolism on Day 1 postoperative. This patient had a vault haematoma of 2-5cm on ultrasound. However, she had no complications related to the vault haematoma.

CHAPTER 4

DISCUSSION

4.1 Incidence of vault haematoma

This is the first study reporting the incidence of vault haematoma following hysterectomy in South Africa. The overall incidence of vault haematoma in this cohort of patients was thirty percent (30%). Available literature reports the incidence of vault haematoma to range from 8% to 98%. The wide range of reported incidence might be explained by the different thresholds for defining the presence of a vault haematoma, mode of ultrasound scan i.e. transvaginal versus abdominal and the differences in the days post-operative when the scan was done. Our results are in keeping with those found by Thomson et al [20], who found the incidence of 25% for patients who had undergone vaginal hysterectomy. In their study, the scan was done on Day 3 or 4 postoperatively and a haematoma was said to be present if it measured at least 2cm in the greatest diameter. In our study, vault haematomas less than 2cm were also included. These small haematomas are less likely to be clinically significant. In contrast, our incidence was higher than that reported by Miskry et al (14%) [9], Kulkarni and Vijaya (10%) [14] and Dane et al (19%) [21] and lower than that reported by Kuhn et al (98%) [10], Haines et al (42.4%) [18], Slavotinek et al (59%) [11] and Rosen et al (73%) [22].

4.2 Vault haematoma and postoperative morbidity

Whether the finding of a vault haematoma is associated with increased postoperative morbidity remains controversial. The current study did not find any association between the presence of a vault haematoma and postoperative morbidity either in form of febrile morbidity, prolonged hospital stay, haemoglobin level or hospital readmission. This finding is similar to findings by Slovatiněk et al [11], Miskry et al [9], and Rosen et al [22]. In contrast, Thomson et al, in their study of 223 vaginal hysterectomies found that the presence of a vault haematoma was significantly associated with febrile morbidity, postoperative haemoglobin drop, blood transfusion, re-presentation to the hospital, and prolonged hospital stay [20]. In addition, two studies done in India showed that there was correlation between vault haematoma and febrile morbidity and urinary symptoms among others [14] [15].

Furthermore, Dane et al [21] found that febrile morbidity was greater with patients who had a large haematoma compared to those with a small haematoma. In our study, one out of the 4 patients with a large haematoma was readmitted with an infected haematoma. It is possible that there is indeed a correlation between the presence of a large vault haematoma and postoperative morbidity. However, the numbers in this study might have been insufficient to detect such a difference.

4.3 Vault haematoma and route of hysterectomy

In this study, the greatest number of haematoma occurred in the abdominal hysterectomy group. However, the incidence was greatest in the vaginal hysterectomy group with none in the laparoscopic or laparoscopic assisted vaginal hysterectomy groups. This however did not demonstrate any statistically significant difference.

Kuhn et al found vault haematoma as an invariable sequel of vaginal hysterectomy with an incidence of 98%. In our study, both of the patients that had a vaginal hysterectomy had a vault haematoma [10]. Few studies have prospectively compared the incidence of haematoma following the different routes. Kulkarni et al compared the incidence of haematoma for abdominal and vaginal routes in 380 patients. The incidence was more in the vaginal hysterectomy group (16.3%) as compared with the abdominal hysterectomy group (4.77%). In another study, Miskry and colleagues compared abdominal, vaginal and laparoscopic hysterectomy [9]. They reported that there was no difference in the rate of vault haematoma among the different routes. In their study of 50 patients, the overall incidence was 14%.

4.4 Indications for hysterectomy

The commonest indication for hysterectomy in this study was uterine leiomyoma. This explains the majority of patients having an abdominal hysterectomy. This is in contrast to other studies that report abnormal uterine bleeding as the commonest indication for hysterectomy with associated larger proportions of hysterectomy done via the vaginal or laparoscopic routes.

4.5 Conclusions

Vault haematoma is a common finding following elective non radical hysterectomy for benign indications, with no increased morbidity in the current study. The route of hysterectomy does not seem to influence the occurrence.

Routine ultrasound cannot be recommended to look for vault haematoma in asymptomatic patients after hysterectomy. However, this is a useful tool in the work up of a patient with postoperative symptoms suggestive of a complicated vault haematoma.

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