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Original Research Article

A study on association of preoperative anaemia and obesity with causes and postoperative outcome in women undergoing hysterectomy for abnormal uterine bleeding

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ABSTRACT

Background: Abnormal uterine bleeding is most commonly encountered in 10-20% of women in reproductive age. The objectives of the study are to assess the proportion and association with causes and postoperative outcome of preoperative anaemia and obesity in women with abnormal uterine bleeding who underwent hysterectomy.

Methods: This was a retrospective observational record-based study conducted in the Dept. of Obstetrics and Gynaecology of Sri Manakula Vinayagar Medical College and Hospital(SMVMCH), Pondicherry. The study population consisted of 169 patients who were admitted for abnormal uterine bleeding and underwent hysterectomy from January 2016 to December 2016 for a period of one year.

Results: The mean age was 43years. The mean value of haemoglobin on admission was 9.89g/dl. The distribution frequencies of patients by WHO BMI classification as underweight, normal, overweight and obesity are 8, 59, 78 and 24 respectively. The distribution frequencies of patients by WHO anaemia classification as no anaemia, mild, moderate are 34, 37 and 98 respectively. Seventy-six patients had blood transfusion. Six patients had urinary tract infection and all of them were anaemic and obese. Two patients had developed respiratory tract infection and none of the patients had developed deep vein thrombosis.

Conclusions: Preoperative anaemia was more common in patients with fibroid and associated with increased morbidity in immediate postoperative period. There is more prevalence of SSI among overweight and obese women.

Keywords: Abnormal uterine bleeding, Hysterectomy, Overweight, Obesity, Preoperative anaemia

INTRODUCTION

Abnormal uterine bleeding is most commonly encountered in 10-20% of women in reproductive age. Even though various medical managements and non-invasive methods are available for management of abnormal uterine bleeding, hysterectomy is the permanent treatment option. Most of the modern treatments available to women in high resource settings or developed countries are not an option for women in low resource areas. Tamilnadu government insurance

scheme also covers only laparoscopic assisted hysterectomy while medical management with LNG-IUS or endometrial ablation procedures are not covered. The aim of preoperative evaluation is to enhance surgical outcome. Pre-operative anaemia is found to be an independent risk factor of morbidity and mortality. Heavy menstrual bleeding in reproductive age group is most common cause for iron deficiency anaemia which leads to many complications in a women life. In a retrospective study done in Harbor-UCLA Medical Center in Torrance, California during the six years 2008-2013 out of 271

premenopausal women who were treated for severe anaemia, 55% of them had heavy menstrual bleeding. Of which 7.8% considered their menses to be normal; while 7% learned of their problem only as result of routine screening for other reasons.¹ There is controversy regarding association between obesity and postoperative morbidity and mortality.^{2,3}

The objectives of the study are to assess the proportion of preoperative anaemia and obesity in women with abnormal uterine bleeding, to assess the association between preoperative anaemia and causes of abnormal uterine bleeding and to evaluate the effect of preoperative anaemia and obesity on immediate postoperative outcome like duration of hospital stay, urinary tract infection, respiratory tract infection, deep venous thrombosis, and surgical site infection.

METHODS

This was a retrospective observational record-based study conducted in the Dept. of Obstetrics and Gynaecology of Sri Manakula Vinayagar Medical College and Hospital(SMVMCH), Pondicherry. The study population consisted of 169 patients who were admitted for abnormal uterine bleeding and underwent hysterectomy from January 2016 to December 2016 for a period of one year. The inclusion criterion was women in reproductive age group (15-49) years that underwent hysterectomy for abnormal uterine bleeding. The exclusion criterion was women in reproductive age group that underwent hysterectomy for other indications like malignancy, prolapse. The data was collected from the file records which included patient age, parity, body mass index(BMI), complaints, indication for surgery, comorbidities like hypertension, hypothyroidism and diabetes, type of hysterectomy, duration of surgery, amount of blood loss during surgery, duration of stay in hospital, admission, preoperative and postoperative hemoglobin, blood transfusion, fever, urinary tract infection, surgical site infection, type of anaesthesia, and histopathological report.

According to WHO haemoglobin <12g/dl is considered anaemia in reproductive age group women. Mild, moderate and severe anaemia is classified with hemoglobin between 11-11.9g/dl, 8-10.9g/dl and <8g/dl respectively.⁴ According to WHO nutritional status is classified into underweight, normal, pre-obesity and obesity when BMI <18.5, 18.5-24.9, 25-29.9, >30 respectively.⁵

Statistical analysis

Data was entered into Microsoft excel data sheet and was analyzed using SPSS 22 version software. Categorical data was represented in the form of frequencies and percentage chi square test used as test of significance for qualitative data.

RESULTS

In the present study 89% of women were <50 years and 11% were >50 years. The mean age was 43 years with SD 6.849. The highest number of AUB was found in para 2 (44.4%) followed by para 3 (34.3%). The mean value of haemoglobin on admission was 9.89g/dl with SD 2.187. The mean value of haemoglobin preoperatively was 10.846 with SD 1.2405. The mean value of haemoglobin postoperatively was 10.556 with SD 1.5171. The mean value of amount of blood loss during surgery was 119.94 ml with SD 95.964.

Table 1: Distribution of Patients by BMI

BMI	Frequency	Percentage
Underweight	8	4.7%
Normal	59	36.1%
Overweight	78	46.7%
Obese	24	12.4%
Total	169	100%

The frequency of patients who underwent abdominal, vaginal and laparoscopic assisted vaginal hysterectomy was 146, 13 and 10 respectively. Eleven patients had co-existing hypertension, twelve had Diabetes and twelve had hypothyroidism.

Table 2: Distribution by type of anemia with respect to World Health Organization

Type of Anemia	On Admission	On Pre-Operation	On Post Operation
No Anemia	26 (15.3%)	34 (20.1%)	19 (11.2%)
Mild Anemia	28 (16.5%)	37 (21.8%)	54 (31.9%)
Moderate Anemia	87 (51.4%)	98 (57.9%)	96 (56.8%)
Severe Anemia	27 (15.9%)	0	0

Table 3: Preoperative Anaemia and SSI

	Anaemia and SSI		
	No SSI	Yes SSI	
No anaemia	28 26.36 (0.10)	6 7.64 (0.35)	34
Anaemia	103 104.64 (0.03)	32 30.36 (0.09)	135
	131	38	169

$\chi^2 = 0.572$, $df = 1$, $\chi^2/df = 0.57$, $P(\chi^2 > 0.572) = 0.4496$
 expected values are displayed in italics
 individual χ^2 values are displayed in (parentheses)

The mean value of duration of stay in days was 12.775 with SD 3.8401. Patients get admitted 2 days prior to surgery and get discharged on postoperative day 8.

The frequency of patients with duration of stay for more than 13 days was 55. Out of which were 50 were anaemic and 34 were overweight and obese. In 32 patients with extended stay both was co-existing. The duration of surgery was prolonged in 14 patients. All these patients were both anaemic and obese. One hundred and fifty patients underwent endometrial biopsy before hysterectomy. the frequency of patients with endometrial pattern types of simple hyperplasia without atypia, complex hyperplasia, proliferative endometrium, shedding endometrium, secretory endometrium were 46,14, 37, 34,19 respectively. According to PALM-COEIN classification of AUB causes, women diagnosed with polyp, fibroid, adenomyosis, malignancy and hyperplasia group were 11, 46, 22, and 60 respectively. Hyperplastic endometrium was found along with fibroid uterus in 14 women. Seventy-six patients had blood transfusion. Six patients had urinary tract infection and all of them were anaemic and obese. Two patients had developed respiratory tract infection and none of the patients had developed deep vein thrombosis.

DISCUSSION

In the present study nearly 83% of women had pre-operative anaemia and 60% were overweight and obese. Twenty three percent of anaemic patients and twenty two percent of overweight and obese patients had SSI. The duration of stay was prolonged in 65% and 66% of patients with overweight and obesity and anaemia respectively. According to Global Nutrition Report 2017 in India 51 per cent of the women of reproductive age suffer from anaemia and more than 22 per cent of adult women are overweight (BMI>25) and 5% were obese (BMI >30).⁶

In 18 large observational studies encompassing over 650,000 surgical patients, the mean prevalence of pre-operative anaemia was around 45-50% among gynaecological patients.⁵ In a study done among women presenting to an emergency facility with AUB, 35% were found to be with anaemia of which 14% were moderately to severe anemic.⁷ In a nationwide sample done in USA 25% of women hospitalized for HMB had anaemia.⁸ In the present study the proportion of preoperative anaemia was 83% and of which 66% of women were moderately to severe anaemic.

In the present study the histological examination revealed more cases of PALM component of AUB. In the present study 58% women with AUB were diagnosed with fibroid and 13% with adenomyosis when compared to another study where AUB-M (hyperplasia and malignancy) contributed to PALM component. In a study done in University of Ghana, 77.9% of women with uterine fibroids had anaemia.⁹ In another study done on

clinical presentation and prevalence of uterine fibroids in rural South India, 68% of women with fibroids had anaemia.¹⁰ Leiomyoma were identified as the cause of bleeding in 47.9% of subjects, in study done in Mayo clinic. In women diagnosed with submucosal fibroid by hysteroscopy 38% had anaemia and 28% of women diagnosed as fibroid by ultrasound irrespective of location had anaemia.¹¹ In the present study 84% of women diagnosed as fibroid by histopathology had anaemia. We have not classified fibroid according to location. In another study which correlated anaemia and pain with location of uterine fibroid, no difference in anaemia was noted in the submucosal group as compared to the non-submucosal group (43.2% vs. 31.5% [OR 1.5]; 95% CI 0.9, 2.6).¹²

In a study where comorbidity of gynaecological and non-gynaecological diseases associated with adenomyosis and fibroid the mean OR of anaemia unspecified, iron deficiency anaemia, other iron deficiency anaemia is 1.3, 1.4, 1.6 respectively in women diagnosed with adenomyosis.¹³ Anaemia was easily anticipated as a comorbid disease of adenomyosis because menorrhagia is one of the primary symptoms.¹⁴ In the present study out of 22 women diagnosed with adenomyosis, 90% had associated anaemia.

All patients with severe anaemia <8g/dl had preoperative blood transfusion. Almost half of the patients 52% with moderate anaemia had perioperative blood transfusion and 21% of patients with mild anaemia had postoperative transfusion. In a data analysis of women undergoing major gynaecological surgery in Australia, the prevalence of preoperative anaemia is 18.1% and it is associated with increased risk of receiving blood transfusion. Preoperative anaemia is common in patients undergoing major gynaecological surgery and is associated with a fivefold increased risk of transfusion.¹⁵ In a retrospective review of hysterectomies the preoperative factors which were associated with transfusion were hematocrit <30, indication for surgery is fibroid/ menorrhagia (OR 3.2; confidence interval [CI]: 1.4-7.4), women undergoing abdominal hysterectomy (OR 3.4; C.I. 2.0-5.7) than vaginal/total laparoscopic hysterectomy. There were no differences in baseline age, race, body mass index (BMI), or tobacco use between transfused and non-transfused patients.¹⁶ In a prospective cohort study done to determine the relationship between preoperative anaemia and perioperative blood transfusion with incidence of surgical site infection, there was a significant association, but the association reduced when the confounder is duration of surgery.¹⁷

The percentage of patients with complex hyperplasia in the present study was 8%. In a retrospective cohort study to evaluate the effect of BMI on endometrial hyperplasia and cancer done in Auckland where half of the study cohort is obese, complex hyperplasia was diagnosed in 4.9% and the risk factors associated were obesity, anaemia and nulliparity.¹⁸ Overweight and obesity were

also considered as risk factors for adenomyosis.¹⁹ But In the present study there was no statistical significant increased risk of adenomyosis($\chi^2= 0.001$, $df= 1$, $\chi^2/df = 0.00$, $P(\chi^2 > 0.001)= 1.1064$) and complex hyperplasia($\chi^2= 0.009$, $df= 1$, $\chi^2/df= 0.01$, $P(\chi^2 > 0.009) = 0.9367$) in overweight and obese women.

In the present study 22% of patients had surgical site infection. In patients with SSI, 87% had preoperative anaemia. The frequency of SSI among patients with severe anaemia, moderate anaemia and mild anaemia was 30%, 23% and 18% respectively. If we take the disease as SSI and the exposed as who are anaemic then the population attributable risk is 0.06214, the population exposure is 81.6%, and the population attributable risk percent is 28.4%. In a study done among non-cardiac surgery patients where preoperative anaemia and postoperative outcome were compared there was no significant difference in SSI, fever and in-hospital mortality between anaemic and non anaemic patients.²⁰ In a cohort study using data from the ACS NSQIP database, the odds ratio of wound infection in patients with preoperative anaemia is 1.66(1.20-2.21).²¹

In the present study also, the duration of surgery was prolonged and was more than 2 hours in all obese patients. In another study from India, the duration of vaginal hysterectomy was slightly longer in obese women, but the time was longest for women with abdominal hysterectomy.²² In a cohort study done among women undergoing hysterectomy for benign conditions in Denmark, 31.9% were classified as overweight and 17.5% as obese. There is significant association between high BMI and operation time.²³

In the present study 86% of overweight and obese and 79% of women with underweight and normal weight had anaemia. In a study where nationally representative data from Mexico (1998 National Nutrition Survey), Peru and Egypt (2000 Demographic and Health Surveys) were analyzed, overweight women from Mexico were equally as likely to suffer from anaemia as non- overweight women. But in Egypt and Peru, though overweight women still suffer from anaemia at higher rate but have lower odds of anaemia than non- overweight women.²⁴ In a study done in Andhra Pradesh, India, women with overweight/obesity or central obesity were less likely to be anaemic as compared to normal weight women.²⁵ Based on a study using Bangladesh Demographic and health survey 2011 data ,being underweight and normal weight is strongly associated with anaemia in adult women.²⁶ In premenopausal Thailand women irrespective of iron status higher BMI was associated with poor iron absorption.²⁷ This may be due to hepcidin-mediated reduced iron absorption and/or increased iron sequestration.²⁸

Twenty-three patients had both obesity and anaemia and associated with SSI. In another nationwide Sweden study, BMI>28 kg/m² was a risk factor for infection after

elective AH.²⁹ In a retrospectively collected data from 2006-2010 National Surgical Quality Improvement Program the odds ratio of wound infections after abdominal hysterectomy in overweight and obese women is 1.7and 3.0 respectively. There is a positive association between increasing BMI and increasing odd of SSI.³⁰

CONCLUSION

Preoperative anaemia was more common in patients with fibroid and associated with increased morbidity in immediate postoperative period. There is more prevalence of SSI among overweight and obese women. Further studies are needed to assess if the management of preoperative anaemia has any impact on patient outcomes.

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