

Optimal timing of post-operative haematocrit check in obstetric and gynaecological surgeries

Aworinde O.O.¹, *Olufemi-Aworinde K.J.², Ogunlaja O.A.¹, Olutogun T.A.²,
Akinola S.E.¹, Adeyemi A.S.³

Abstract

Background: Haemorrhage is a feared albeit common complication of surgery in Obstetrics and Gynaecology. Measurement of haematocrit post operatively is believed to be part of good medical practice since it gives an inkling to intraoperative and immediate post-operative blood loss and the need for blood transfusion. The objective of the study is to determine if there was any difference between haematocrit values gotten on day 1 and 2 and also to determine the optimal time for the post-operative haematocrit check.

Methods: One thousand patients who had surgery in the department of Obstetrics and Gynaecology of LAUTECH Teaching Hospital (LTH) and Bowen University Teaching Hospital (BUTH), Ogbomoso were recruited. Capillary blood samples were obtained at 24hours and 48 hours post operatively. The haematocrit was determined using a 24 place micro haematocrit centrifuge and the values checked using a haematocrit reader. Frequency tables and charts were made and results were tested for significance with level of significance (α) set at 0.05.

Results: The mean age of the patients was 32.88 ± 9.45 , with a modal age group of 21-30years. The commonest obstetric surgery done was caesarean section (60.6%) while the commonest gynaecological surgery was myomectomy (13.8%). There is a significant difference between the haematocrit values gotten on day one and two ($p=0.000$). There was significant difference between the haematocrit values on both days and the unit the patient was managed; the type of surgery done and the age group of the patient.

Conclusion: The haematocrit on postoperative day 2 is more representative of the blood loss.

Keywords: postoperative, haematocrit, obstetrics, gynaecology

*Correspondence author

Olufemi-Aworinde K.J.

<http://orcid.org/0000-0001-6348-5840>

Email: kehindejoyce@yahoo.com

¹Department of Obstetrics and Gynaecology, Bowen University Teaching Hospital, Ogbomoso, Nigeria.

²Department of Haematology and Blood Transfusion, Bowen University Teaching Hospital, Ogbomoso, Nigeria.

³Department of Obstetrics and Gynaecology, LAUTECH Teaching Hospital, Ogbomoso

Date of Submission: February 14, 2017

Date of Acceptance: April 24, 2018

Research Journal of Health Sciences subscribed to terms and conditions of Open Access publication. Articles are distributed under the terms of Creative Commons Licence (CC BY-NC-ND 4.0). (<http://creativecommons.org/licenses/by-nc-nd/4.0>).

<http://dx.doi.org/10.4314/rejhs.v6i1.5>

Calendrier optimal de la vérification de l'hématocrite postopératoire dans les chirurgies obstétricales et gynécologiques

Aworinde O.O.¹, *Olufemi-Aworinde K.J.², Ogunlaja O.A.¹, Olutogun T.A.²,
Akinola S.E.¹, Adeyemi A.S.³

Abstrait

Objectif: L'hémorragie est une complication souvent redoutée de la chirurgie en obstétrique et en gynécologie. On pense que la mesure de l'hématocrite après l'opération fait partie d'une bonne pratique médicale, car elle donne une idée de la perte de sang postopératoire peropératoire et immédiate et du besoin de transfusion sanguine. L'objectif de l'étude est de déterminer s'il y avait une différence entre les valeurs de l'hématocrite obtenues les jours 1 et 2 et également de déterminer le moment optimal pour la vérification de l'hématocrite postopératoire.

Méthodes: Un millier de patients opérés dans le département d'obstétrique et de gynécologie du LAUTECH Teaching Hospital (LTH) et de l'hôpital universitaire de Bowen (BUTH), Ogbomoso, ont été recrutés. Des échantillons de sang capillaire ont été obtenus 24 heures et 48 heures après l'opération. L'hématocrite a été déterminé à l'aide d'une centrifugeuse à micro-hématocrite à 24 positions et les valeurs ont été vérifiées à l'aide d'un lecteur d'hématocrite. Des tableaux de fréquence et des graphiques ont été réalisés et les résultats ont été testés pour la signification avec le niveau de signification (α) fixé à 0,05.

Résultats: L'âge moyen des patients était de $32,88 \pm 9,45$, avec un groupe d'âge modal de 21-30 ans. La chirurgie obstétricale la plus courante était la césarienne (60,6%) alors que la chirurgie gynécologique la plus fréquente était la myomectomie (13,8%). Il y a une différence significative entre les valeurs d'hématocrite obtenues le premier et le deuxième jour ($p = 0,000$). Il y avait une différence significative entre les valeurs de l'hématocrite sur les deux jours et l'unité du patient a été gérée; le type de chirurgie effectuée et le groupe d'âge du patient.

Conclusion: L'hématocrite au deuxième jour postopératoire est plus représentatif de la perte de sang.

Mots-clés: postopératoire, hématocrite, obstétrique, gynécologie

*Correspondance auteur

Olufemi-Aworinde K.J.

<http://orcid.org/0000-0001-6348-5840>

Email: kehindejoyce@yahoo.com

¹Department of Obstetrics and Gynaecology, Bowen University Teaching Hospital, Ogbomoso, Nigeria.

²Department of Haematology and Blood Transfusion, Bowen University Teaching Hospital, Ogbomoso, Nigeria.

³Department of Obstetrics and Gynaecology, LAUTECH Teaching Hospital, Ogbomoso

Date of Submission: February 14, 2017

Date of Acceptance: April 24, 2018

Research Journal of Health Sciences subscribed to terms and conditions of Open Access publication. Articles are distributed under the terms of Creative Commons Licence (CC BY-NC-ND 4.0). (<http://creativecommons.org/licenses/by-nc-nd/4.0>).

<http://dx.doi.org/10.4314/rejhs.v6i1.5>

Res. J. of Health Sci. Vol 6(1), Jan./Mar., 2018

36

INTRODUCTION

Haemorrhage complicates surgery in Obstetrics and Gynaecology (1,2); just like other surgical specialties, it is a complication most surgeons dread. It could result in impairment of recovery in the immediate post-operative period, prolonged hospital stay, increased cost of healthcare, infections, and ultimately death (3,4,5). Haemorrhage complicating surgery at times leads to hysterectomy with injury to the ureters being a possible complication (2,3).

There are various methods of estimating blood loss following surgery; however, the haematocrit balance is believed to be the most reliable (4,6). The major drawback is that it is not helpful intraoperatively since equilibration would not have taken place (5). Nevertheless, measurement of haematocrit post operatively is believed to be part of good medical practice since it gives an inkling to intraoperative and immediate post-operative blood loss and the need for blood transfusion (4,6).

A detailed search of literature revealed little information as to the timing of post-operative haematocrit following surgery in Obstetrics and Gynaecology. This has been corroborated by authors in other faculties (4,6). In our institutions, we found out that there was an inconsistent timing of post-operative haematocrit; with most measurements being done either on postoperative (POD) 1 or 2. Due to the dearth of evidence based information, we tried to determine if there was any difference between haematocrit values gotten on day 1 and 2 and also to determine the optimal time following surgery to measure the post-operative haematocrit between the two days.

MATERIALS AND METHODS

In this prospective cross sectional study, one thousand patients who had surgery in the department of Obstetrics and Gynaecology over a three year period were recruited. The patients were enlisted using purposive sampling on the antenatal, labour and gynaecological wards of LAUTECH Teaching Hospital (LTH), Ogbomoso and Bowen University Teaching Hospital (BUTH), Ogbomoso. The study was approved by the Ethics committee of Bowen University Teaching Hospital, Ogbomoso and all participants provided informed consent. Both hospitals are tertiary health institutions located in Ogbomoso, Oyo state south western Nigeria. The hospitals cater to the health needs of the people of Oyo state in Southwestern Nigeria and Kwara state in North central Nigeria. They

both have robust departments of Obstetrics and Gynaecology with all cadres of health personnel available. They are both referral centres receiving predominantly Yoruba patients from south-west and north-central Nigeria. Other tribes commonly assessing these hospitals are the Hausas and Igbos.

Demographic and clinical information were extracted from the case file of each patient. Data obtained include age, occupation, socioeconomic status, level of education, parity, indication for the surgery and type of surgery done.

Prior to surgery, an informed consent was obtained from each patient. The surgeries were done as per the unit protocol with no influence from the investigators. All patients undergoing surgery in the department of Obstetrics and Gynaecology were included in the study except patients with preoperative anaemia, day case surgery, transfusion within 48 hours of surgery, haemoglobinopathies and intensive care unit admissions. Capillary blood samples were obtained in a capillary tube at 24 hours and 48 hours post operatively. The haematocrit was determined using a 24 place micro haematocrit centrifuge (Haematospin 1400 manufactured by Hawksley & Sons Ltd, Lancing, England) and the values checked using a haematocrit reader.

Statistical analysis

Statistical analysis was done using SPSS version 20 (IBM, Armonk, NY). Frequency tables and charts were made and results were tested for significance using the paired t-test for continuous variables and chi square for categorical variables with level of significance (α) set at 0.05.

RESULTS

Characteristics of the patients

The mean age of the patients was 32.88 ± 9.45 , with a modal age group of 21-30 years. The least represented age group was those greater than 60 years. As shown in table 1, most of the patients were of low parity (83.9%), in social class I (55.6%), of Yoruba tribe (72.7%) with most having tertiary education. 60.6% of the patients were obstetric patients.

Type of surgery done and their indications

As shown in Table 2, the commonest surgery done was caesarean section. This was done in all the obstetric patients (60.6%). The commonest indication for caesarean section was previous caesarean section scar. The commonest gynaecological surgery was myomectomy

(13.8%) followed by total abdominal hysterectomy (9.9%).

Comparison of packed cell volume on day 1 and 2

Table 3 shows a comparison of the haematocrit at 24 hours and that of 48 hours. There is a significant difference between the haematocrit values gotten on day one and two, $p=0.000$

Comparison of patient characteristic and difference between PCV on day 1 and 2

Table 4 shows the comparison of the haematocrit on both days and the unit the patient was managed; the type of surgery done and the age group of the patient. There was significant difference among all the groups the haematocrit was compared with.

DISCUSSION

Practice of medicine is an apprenticeship, with the practice handed down from teachers to students. Despite this being a widely accepted method, mistakes are handed down from generation to generation and vice versa (7). In these days of evidence based medicine, it is important to find a scientific basis for most if not all medical practice (8). This necessitated our trying to find out when the optimal timing for post operative hematocrit is.

Surgery involves primary haemorrhage and at times reactionary haemorrhage (9). The primary haemorrhage is often obvious intraoperatively while reactionary takes up to 24 hours to be diagnosed. Our study shows that there is a significant difference between hematocrit values on day 1 and day 2. This could be due to ongoing blood loss from the wound site, further dilution by intravenous fluids, timing of equilibration of the blood after acute blood loss and atimes inflammatory response to surgery (4). Various studies have shown that reequilibration of blood after acute blood loss or transfusion usually occurs within 24 hours (6, 10, 11). This implies that the difference noticed was due to ongoing blood loss. We therefore infer that the hematocrit done on POD 1 is not a true representation of the post operative blood volume. For the patient to benefit optimally from the post-operative haematocrit following surgery in obstetrics and gynaecology, it should be done on POD 2. This is in contrast with the opinion of Khalfaoui et al who believe that the blood loss should be evaluated within 24 hours (6). As earlier stated, within the limit of our search we

could not get studies in obstetrics and gynaecology to compare our results with; making this study a reference work for further studies in the field.

CONCLUSION

The hematocrit on POD 2 is more representative of blood loss resulting from surgery in obstetrics and gynaecology. We are thus recommending that post-operative haematocrit check should be done on POD 2.

Conflict of interest: The authors declare no conflict of interest.

Acknowledgement: We hereby acknowledge the contributions of staff of the obstetric and gynaecological wards in both Bowen and LAUTECH teaching hospital, Ogbomoso.

REFERENCES

1. Tomacruz RS, Bristow RE, Montz FJ. Management of pelvic hemorrhage. *Surg Clin North Am.* 2001;8(14):925–948
2. Tinelli A. Post-Cesarean Section Hemorrhage Treated by a Collagen Patch Coated with the Human Coagulation Factors. *J Clin Case Reports.* 2011. 1:e103. doi:10.4172/2165-7920.1000e103 (accessed 5th February 2018)
3. Erian M, Mc Laren G, Khalil A. Reactionary Hemorrhage in Gynecological Surgery. *JSLS.* 2008;12(1): 81–84
4. Nagra NS, Popta D, Whiteside S, Holt EM. An analysis of postoperative hemoglobin levels in patients with a fractured neck of femur. *Acta Orthopaedica et Traumatologica Turcica.* 2016;50(5): 507-513
5. Halm EA, Wang JJ, Boockvar K, Penrod J, Silberzweig SB, Magaziner J. Effect of perioperative anemia on clinical and functional outcomes in patients with hip fracture. *J Orthop Trauma.* 2004;18(6):369-374
6. Khalfaoui MY, Godavitarne C, Wilkinson MCP. Optimal Timing for Hemoglobin Concentration Determination after Total Knee Arthroplasty: Day 1 versus Day 2. *Knee Surg Relat Res.* 2017;29(1):52-56.
7. Barsuk JH, Szmuilowicz E. Evaluating medical procedures: Evaluation and transfer to bedside . In: Pangaro LN, McGaghie WC (eds). Alliance for Education's Handbook on Medical Student Evaluation and Assessment. 1st ed. Syracuse, New York: Gegensartz press; 2015. p114
8. Kelly MP, Heath I, Howick J, Greenhalgh T. The importance of values in evidence-based medicine. *BMC Med Ethics.* 2015; 16: 69.
9. Marietta M, Facchini L, Pedrazzi P, Busani S, Torelli G. Pathophysiology of bleeding in surgery. *Transplant Proc.* 2006; 38(3):812-4.
10. Gao F-Q, Li Z-J, Zhang K, Sun W, Zhang H. Four

- Methods for Calculating Blood-loss after Total Knee Arthroplasty. *Chinese Medical Journal*. 2015;128(21):2856-2860
11. Audu LI, Otuneye AT, Mairami AB, Mshelia LJ, Nwatah VE. Posttransfusion Haematocrit

Equilibration: Timing Posttransfusion Haematocrit Check in Neonates at the National Hospital, Abuja, Nigeria. *International Journal of Pediatrics*. 2015;2015: 1-5

Table 1: Characteristics of the patients

Characteristic	Patient population N=1000
Mean age (years)	32.88±9.45
<20	43 (4.3%)
21-30	475 (47.5%)
31-40	365 (36.5%)
41-50	55 (5.5%)
51-60	39 (3.9%)
>60	23 (2.3%)
Parity	1.87±1.58
Low parity (<4)	839 (83.9%)
High parity (=4)	161 (16.1%)
Social class	
I	556 (55.6%)
II	244 (24.4%)
III	125 (12.5%)
IV	53 (5.3%)
V	22 (2.2%)
Tribe	
Yoruba	727 (72.7%)
Ibo	104 (10.4%)
Hausa	125 (12.5%)
Others	44 (4.4%)
Occupation	
Professional	448 (44.8%)
Artisan	344 (34.4%)
Housewife	108 (10.8%)
Student	100 (10.0%)
Educational status	
Tertiary	506 (50.6%)
Secondary	314 (31.4%)
Primary	105 (10.5%)
No formal education	75 (7.5%)
Unit attended	
Obstetrics	606 (60.6%)
Gynaecology	394 (39.4%)

Table 2: Type of surgery

Type of surgery done	Indication for surgery	% of surgery
Caesarean section	Previous caesarean scar	156
	Antepartum haemorrhage	26
	CPD/Obstructed labour	99
	Fetal distress	141
	Maternal request	58
	Hypertension in pregnancy	86
	Abnormal lie/presentation	40
	Total	606 (60.6%)
Myomectomy	Fibroid	138 (13.8%)
	Cervical cancer/CIN 3	7
Total abdominal hysterectomy	Ovarian mass/accident	16
	Fibroid	67
	Septic abortion	9
	Total	99 (9.9%)
Oophorectomy/ ovarian cystectomy	Ovarian mass/accident	56 (5.6%)
Salpingectomy/ salpingoophorectomy	Ruptured ectopic pregnancy	48 (4.8%)
Exploratory laparotomy + uterine repair	Septic abortion	20 (2.0%)
Vaginal hysterectomy + pelvic wall repair	Uterovaginal prolapse	16 (1.6%)
Vesicovaginal fistula repair	Vesicovaginal fistula	10 (1.0%)
Tubal surgery	Tubal factor infertility	7 (7%)
Total		1000 (100%)

Table 3: Haematocrit on POD 1 versus POD 2

Day of test	Mean	df	p-value	95%CI	Correlation
Day 1	31.47±4.414	999	0.000*	0.954 to 1.356	0.752
Day 2	30.31±4.759				

*paired t test

Table 4: Comparison of patient characteristic and difference between PCV on day 1 and 2

Patient characteristic	Haematocrit difference		
	None	Day 1 value higher	Day 2 value higher
Type of patient*			
Obstetric	125	339	142
Gynaecological	110	147	137
Type of surgery done**			
Caesarean section	129	333	144
Oophorectomy/ cystectomy	21	4	31
Myomectomy	7	77	54
TAH	24	45	30
Vaginal hysterectomy	1	9	6
Salpingectomy/ salpingoophorectomy	27	15	6
Laparotomy + uterine repair	14	3	3
Tubal surgery	7	0	0
VVF repair	5	0	5
Age group (years)***			
<20	235	486	279
21-30	18	4	21
31-40	137	231	107
41-50	80	188	97
51-60	0	35	20
51-60	0	22	17
>60	0	6	17

* Chi square value = 33.459, df= 2, p value= 0.000

** Chi square value = 166.031, df= 16, p value= 0.000

*** Chi square value = 93.774, df= 10, p value= 0.000