

A Comparative Study of Two Methods Quantitative Assessment and Alkaline Hematin Method to Estimate Blood Loss During Third Stable of Labour

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ABSTRACT

Introduction: Opinion and expertise of a specialist is very much needed during third stage of delivery and to minimize the blood loss and its consequences. Timely intervention is essential to mitigate the problem. There is no uniform and common agreement regarding the amount of blood loss is to be taken as criteria to say PPH. As the percentage of blood loss increases proportionately the risk of complications will increase. Objectives of the study were to estimation of blood loss during third stage of labour and to comparison of blood loss by quantitative assessment with optical density method.

Materials and Methods: 200 cases of normal pregnant women who came to Niloufer Hospital for delivery were included during the study. Estimation of blood loss through collection and optical density method was done and both were compared. Patient wise data compiled and analyzed by taking variables like age, parity, weight of the mother and baby and blood volume.

Results: Wide variations were observed in both methods. Average (90 ml measured) 190 ml alkaline hematin method. The blood loss by alkaline hematin method was found to be almost double than the blood loss by the measured loss.

Conclusion: Blood loss by alkaline hematin method was found to be almost double the measured loss and it is more accurate estimation of blood loss and under estimation of measured blood loss is emphasized. Though this method is accurate and it can't be used routinely for estimation of blood loss.

Keywords: Post Partum Hemorrhage (PPH), Alkaline Hematin (AH), PCV, Hb%

INTRODUCTION

Cool, organized thinking and expertise judgment of obstetrician are essential to reduce PPH related complications during the time of delivery especially in third stage of labour. PPH is one of the common causes for maternal complications. Sudden onset of complications is the reasons for helplessness of obstetricians. The definition and amount of blood loss in PPH, there is no uniformity and agreed policy in the literature.

In the standard text books of OBG, the blood loss of more than 500 ml by vaginal delivery and 1000ml in cesarian section is taken as a criteria to describe PPH.

Methods of measuring blood loss have been summarized by

Wilcoxon et al¹(1924):

Direct measurement 2. Photoelectric technique 3. Gravimetric procedure 4. Volumetric method²

Since Spectro photo electric method appears to be most accurate, one of the alkaline hematin method was chosen for use in this study. Aim and Objectives of the study were to estimation of blood loss during third stage of labour and to comparison of blood loss by quantitative assessment with optical density method.

MATERIALS AND METHODS

Two hundred normal pregnant women were booked for estimation of blood loss at Niloufer Hospital. The following data was taken for every patient:

Weight in kg 2. Hb% Sahli's method, 3. PCV by microcapillary method

About 0.04 ml of peripheral blood was taken by Hb pipette in 4 ml of 5% NaOH solution. This is standard solution used for calculation of blood loss by alkaline hematin method. After delivery of the patient blood was collected in a basin and then measured in a 100 ml of graduated jar. This amount of blood was poured in 2000 ml of 5% NaOH solution in a plastic bucket. (5% NaOH was prepared by adding 100 gms of NaOH pellets in 2000 ml of distilled water)

In addition to the measured blood poured into the NaOH solution, the apparatus used to collect the blood was rinsed in the solution. All the pads and clots and swabs were also soaked and squeezed thoroughly in NaOH solution. One hour after delivery, the soaked perineal pads and all the clots which were obtained after exploring the uterus were also soaked and squeezed in NaOH solution. About 10 ml of above solution was taken and centrifuged for 10 minutes at 3000 rpm. This is the unknown used to calculate the blood loss by optical density method.

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How to cite this article: T. Subhashini. A comparative study of two methods quantitative assessment and alkaline hematin method to estimate blood loss during third stable of labour. International Journal of Contemporary Medical Research 2016;3(1):88-90.

One hour after delivery general condition of the patient was noted by taking pulse rate, pallor, BP and also enquired about how they felt.

To calculate the blood loss by alkaline hematin method²:

The optical density of standard and unknown is determined at 530 nm. The blood loss was calculated by using the formula:

Blood loss = Optical density of unknown x 2000 / optical density of standard x 100

To calculate the percentage of total blood volume lost at delivery is calculated by the formula:

0.036 x estimated blood loss x observed hematocrit/body weight

RESULTS

Table 1 shows relation of blood volume to blood loss. Blood volume was taken in 5 ranges starting from 3000 to 5500ml of blood. Blood volume ranging from 3000-5500 ml showed decrease in blood loss i.e., 120-83 (measured) 270-190 (AH). Table 2 shows age wise blood loss. No significant relation was observed in blood loss with age.

Body weight ranging from 40 to 60 kg showed slight increase in blood loss with increasing weight of the mother.

Table 4 shows the relationship between parity to amount of blood loss during delivery. As increase of parity, proportionately blood loss also increased.

Table 5 shows blood loss in relation to weight of the baby. It has increased with increasing of baby weight.

Table 6 shows the relationship between normal and abnormal cases of delivery. Delivery done other than vaginal was considered as abnormal. Blood loss is more in abnormal cases compared to normal in both the methods.

Table 7 shows the relationship between PCV and blood loss. PCV range is taken from 27 to 40 and observed relationship with increase of PCV to blood loss. No changes seen with relation to PCV in blood loss.

Table 8 shows relation of Hb% with blood loss. No relation to blood loss is observed with Hb%.

DISCUSSIONS

In the present study, blood loss in third stage of labour in 200 cases was done by quantitative assessment and alkaline hematin method and compared. Previous studies showed wide individual variations in blood loss by various methods. Blood loss in normal pregnant women was measured in 200 cases. Since spectro photo electric method of measuring blood loss appeared to be most accurate. One of these is alkaline hematin method was chosen for use in this study and compared with measured blood loss.

This method was first used to measure menstrual blood during menstrual cycle by Hallbegg and Nelson (1964) and further evaluation of this method was done by S.T.Shaw, Aurenson^{3,4} (1972) and found most accurate. Previous studies

S.NO	Mother's blood volume (ml)	No of cases	Blood loss-measured MI	Blood loss-alkaline method MI
1	3000-3500	18	91.44	194.01
2	3501-4000	66	120.43	272.67
3	4001-4500	57	111.40	263.46
4	4501-5000	36	103.9	240.53
5	5001-5500	16	83.75	190.12

Table-1: Relation of blood volume to blood loss

S.NO.	Age in years	No of cases	Blood loss-measured MI	Blood loss-ah MI
1	15-20	21	92.31	213.31
2	21-25	55	95.89	22.54
3	26-30	112	118.54	258.4
4	31-35	12	88	285.16

Table-2: Relation of age to blood loss

S.NO	Mother's body weight in kgs	No of cases	Blood loss-measured ml	Blood loss ah method ml
1	40-45	31	97.55	222.47
2	46-50	80	114.41	236.25
3	51-55	46	120	268.2
4	56-60	28	103.5	279.6
5	60+	16	84.3	205.5

Table-3: Relation of mother's body weight and blood loss

S.NO	Parity	No of cases	Blood loss-measured ml	Blood loss ah method ml
1	1	46	106.42	247.61
2	2-4	121	100.17	246.7
3	5+	30	112.85	273.34

Table-4: Relation of parity to blood loss

S.NO	Baby weight in kgs	No of cases	Blood loss measured (ml)	Blood loss ah method ml
1	2-2.5	64	94.03	216.4
2	2.6-3	108	110.9	254.4
3	3.1-3.5	20	113.75	307.24
4	3.6-4	8	195	388.45

Table-5: relation of baby weight to blood loss

S.NO	Type of delivery	Blood loss-measured ml	Blood loss ah method ml
1	Normal	90	190
	Abnormal cases		
2	Instrumental	163.33	346.99
3	Post caesarian	193.33	438.6
4	Accelerated labour	128.0	379.6
5	Malpresentation	110	289.75

Table-6: Relation of blood loss in normal and abnormal cases

S.NO.	PCV	No of cases	Blood loss-measured	Blood loss-AH
1	27-28	2	100	234
2	29-30	11	110.55	266
3	31-32	52	166.8	204.4
4	33-34	68	127.35	306.11
5	35-36	49	114.96	271.61
6	37-38	16	78.60	163.72
7	39-40	2	66.67	148.95

Table-7: Relation of packed red cell volume to blood loss

S.NO.	Hb Gm%	No of cases	Blood loss-measured	Blood loss-AH
1	8-9	4	68.75	163.18
2	9.1-10	6	98.82	211.48
3	10.1-11	108	116.28	280.54
4	11.1-12	65	113.69	253.14
5	12.1-13	17	55	118.59

Table-8: Relation of hemoglobin to blood loss

noted very wide individual variations in blood loss by various methods. Same thing was observed in the present series with a loss ranging from 30-400 cc. Average about 90 ml by measurement and 190 ml by alkaline hematin method. It has been shown that blood loss by alkaline hematin method is almost double the measured loss and it is more correct estimation of blood loss. Thus the clinical importance of this under estimation of blood measured blood loss is emphasized. Though this method appears to be more accurate and reproducible but it is not practicable for routine estimation.

Since there is considerable variation between patients in the amount of blood loss it seemed worthwhile to enquire further into possible causes. There is undoubtedly many factors that may affect blood loss even in apparently normal women. No obvious effects due to age, race and antepartum care etc., were noted by Dr Newton from the present series no affects due to age, PCV, Hb% were noted but Grand multipara, Grand multies i.e., para 5 and above showed an increase in blood loss.

A definite effect of episiotomy was also noted by Michael Newton⁷, this might be the cause of blood loss in primies in present series as all of them were given medio-lateral episiotomy. Specific obstetric factors implicated by Connetal included weight of the baby, prolong labour, ill judged sedation, weight of the placenta in this series as baby weight increase blood loss also showed an increase. Other factors were not observed.

According to Michel Newton 1961^{8,9}, operative delivery by use of forceps did not appear to contribute to blood loss. It might be assumed that any excess bleeding in this incidence is due to episiotomy. That is always required. In this series forceps deliveries showed an increase of blood loss as explained by Newton this might be due to episiotomy. According to Abraham Shulman,¹⁰ an estimated loss of 10% of total blood volume may be considered as PPH although the clinical symptoms may not be apparent.¹⁰

CONCLUSION

About 200 cases of normal pregnant women were booked. Blood loss was measured by 2 methods qualitative and alkaline hematin method and both were compared. The percentage of total blood volume lost showed a wide variation from 0.5 to 10% in normal cases. It was shown that patients with lesser blood volume develop features of hemorrhage with less amount of blood loss or in other words patients with higher blood volume can withstand better a certain amount of blood loss than a patient with low blood volume. So it is better to improve the socio-economic status of the patient.

Thus blood loss by alkaline hematin method was found to be almost double the measured loss and it is most accurate estimation of blood loss and under estimation of measured blood loss is emphasized. Though this method is accurate it can't be used routinely for estimation of blood loss.

Blood loss and its relation to various factors have been noted and it was found that it is not dependent on age, PCV, Hb% but showed increased loss increase of mother's body weight and baby, abnormal deliveries etc.,

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Source of Support: Nil; **Conflict of Interest:** None

Submitted: 17-11-2015; **Published online:** 02-12-2015